

# KIC 009946525

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009946525-01	OBS	0398.01	51.846917	170.080573	9676.3	4.832	188.1	189.4	0.84	5227	8.85	6.92
009946525-02	OBS	0398.02	4.180047	131.919048	1764.6	2.559	102.8	109.5	0.84	5227	3.88	198.53
009946525-03	OBS	0398.03	1.729356	132.093511	458.6	1.852	36.4	40.8	0.84	5227	2.18	644.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009946525-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009946525-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009946525-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

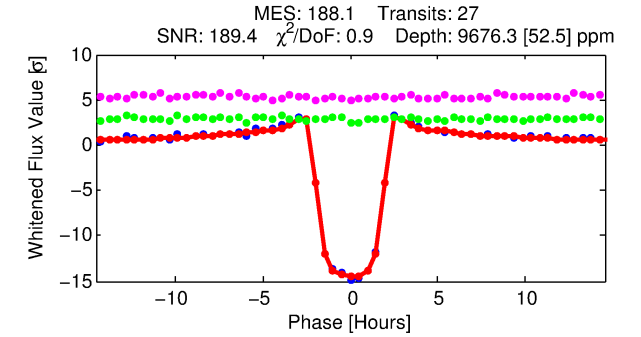
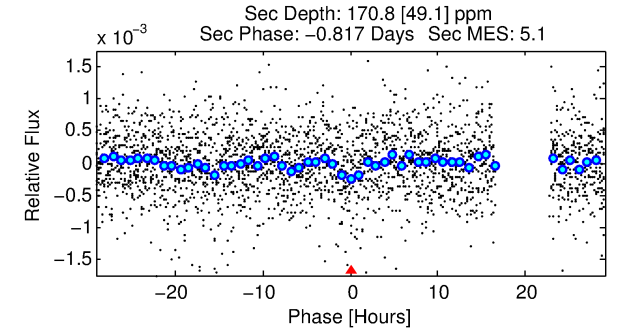
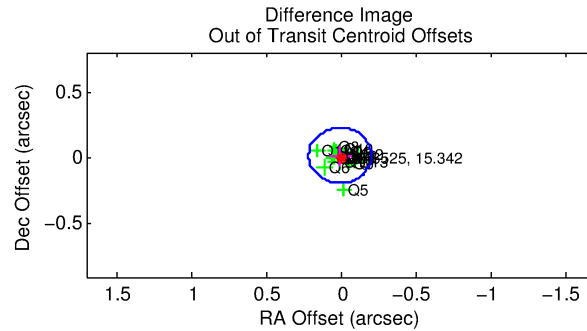
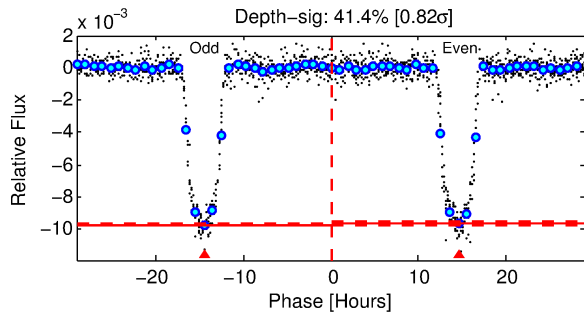
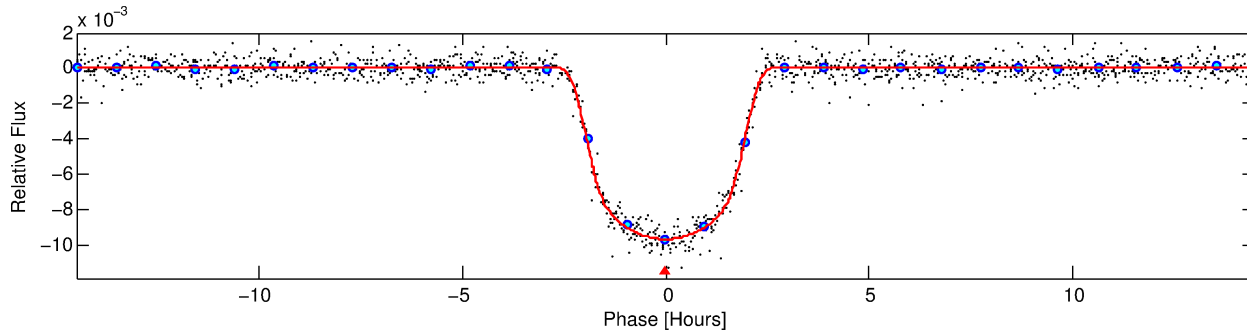
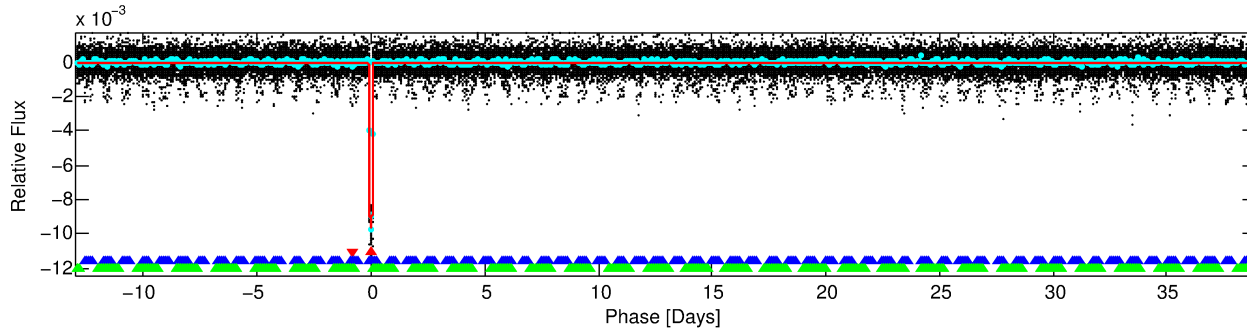
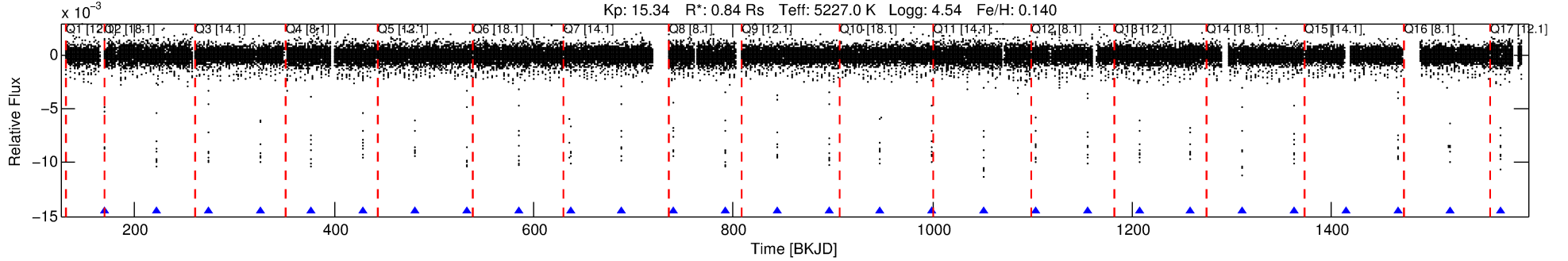
Ephemeris Match Information For 009946525-01

No Significant Match Found

# DV One-Page Summary

KIC: 9946525 Candidate: 1 of 3 Period: 51.847 d

KOI: K00398.01 Corr: 0.995



## DV Fit Results:

Period = 51.84692 [0.00003] d  
Epoch = 170.0806 [0.0005] BKJD  
Rp/R\* = 0.0967 [0.0007]  
a/R\* = 68.55 [1.58]  
b = 0.71 [0.02]  
Seff = 6.91 [0.91]  
Teq = 413 [14] K  
Rp = 8.84 [0.72] Re  
a = 0.2606 [0.0193] AU  
Ag = 81.58 [25.30] [3.18 $\sigma$ ]  
Teffp = 1921 [142] K [10.59 $\sigma$ ]

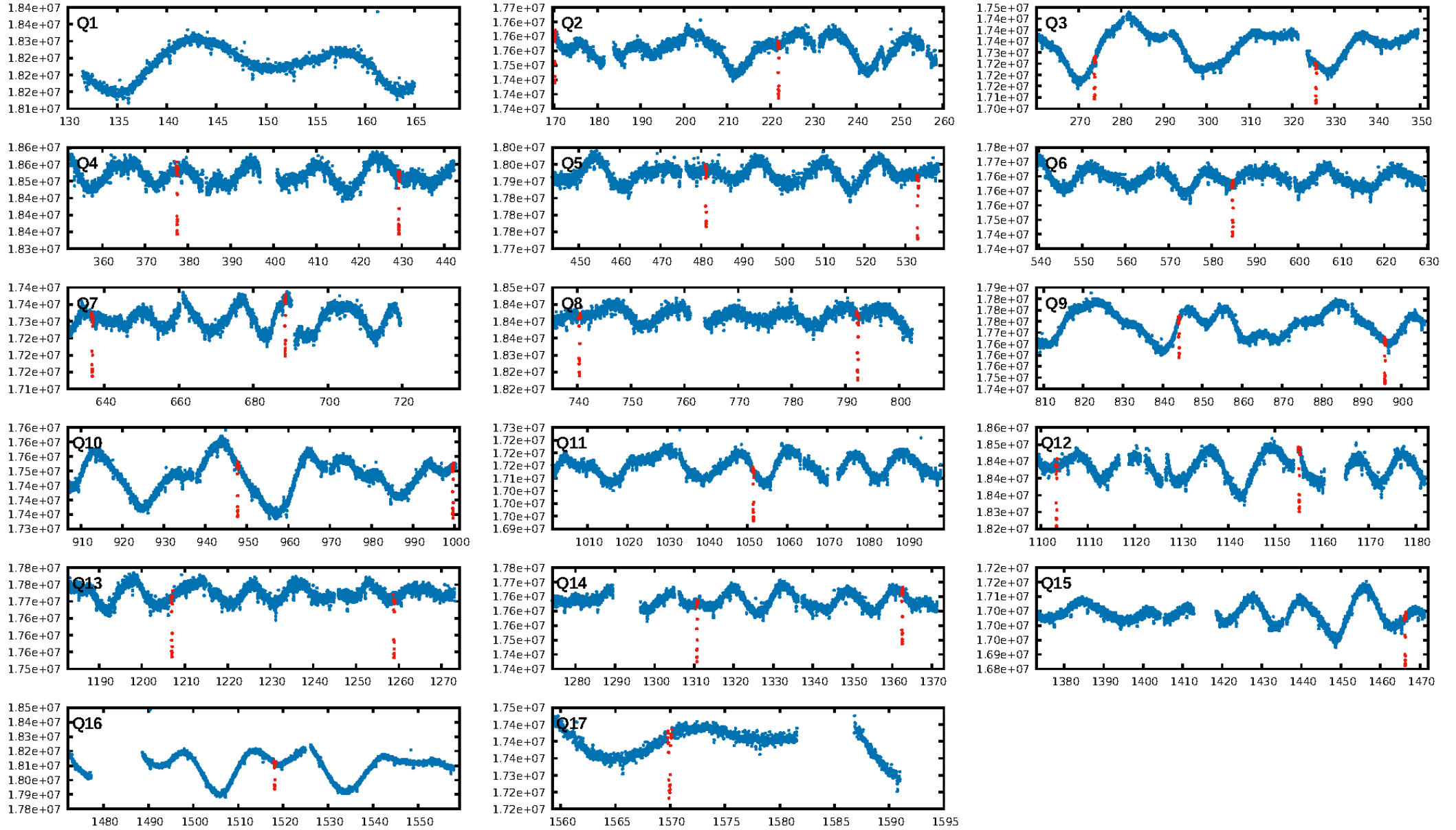
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [209.24 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [26/26]  
GhostDiagnostic-chr: 4.361  
Centroid-sig: 0.0%  
Centroid-so: 0.211 arcsec [4.41 $\sigma$ ]  
OotOffset-rm: 0.020 arcsec [0.28 $\sigma$ ]  
KicOffset-rm: 0.141 arcsec [2.03 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 0.44 [7/16]

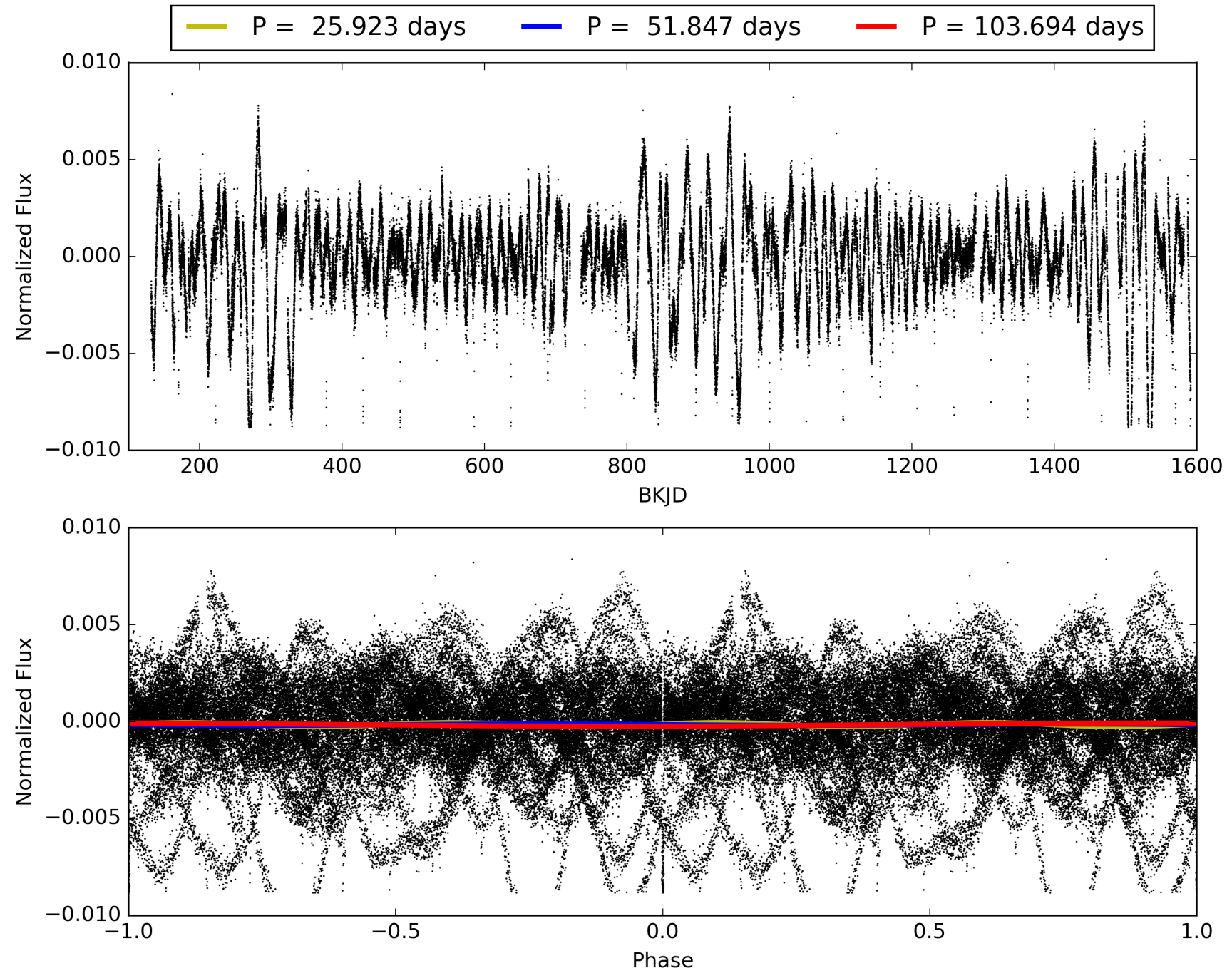
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:05:12 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009946525-01, PDC Light Curves

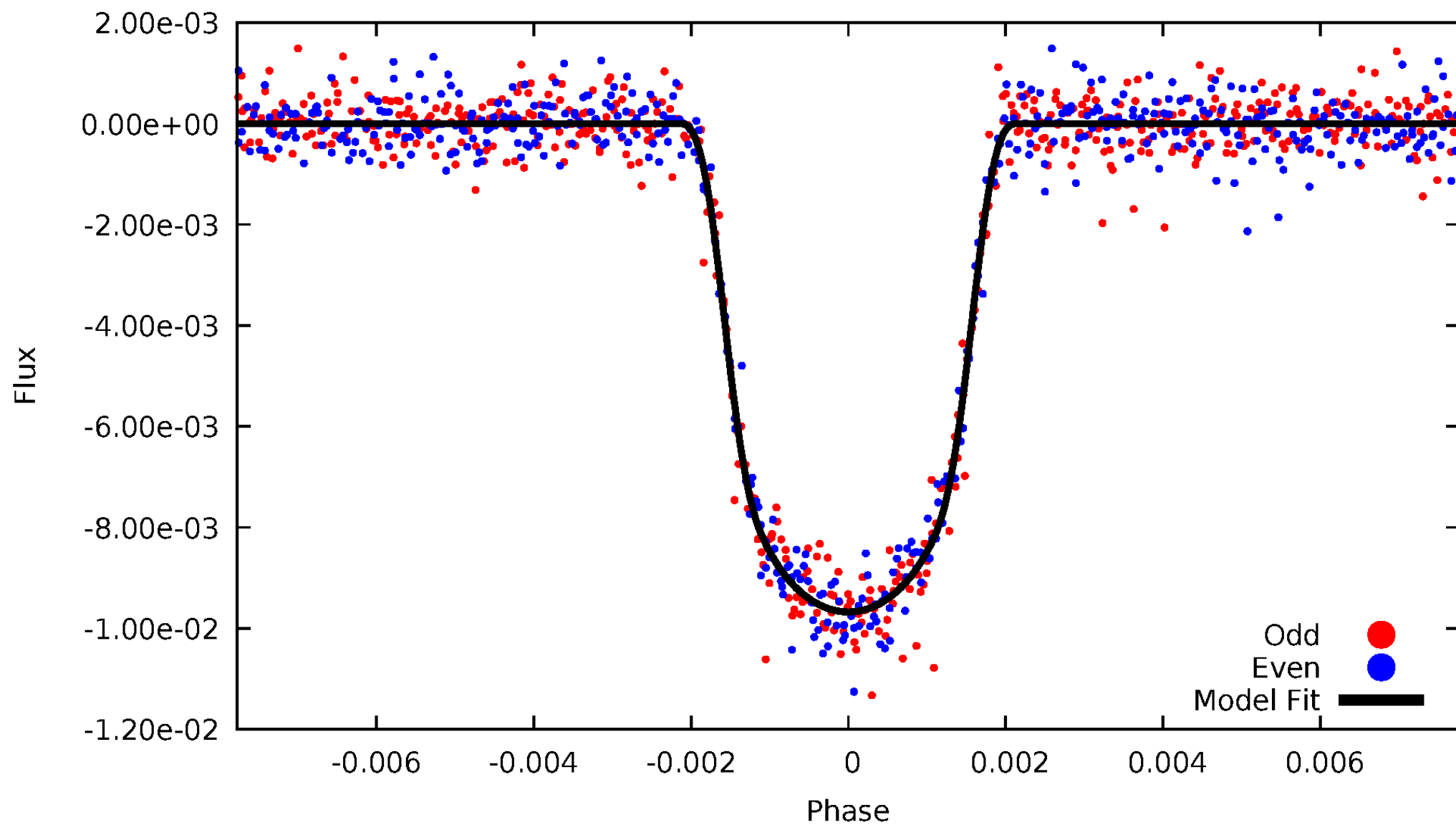


TCE 009946525-01



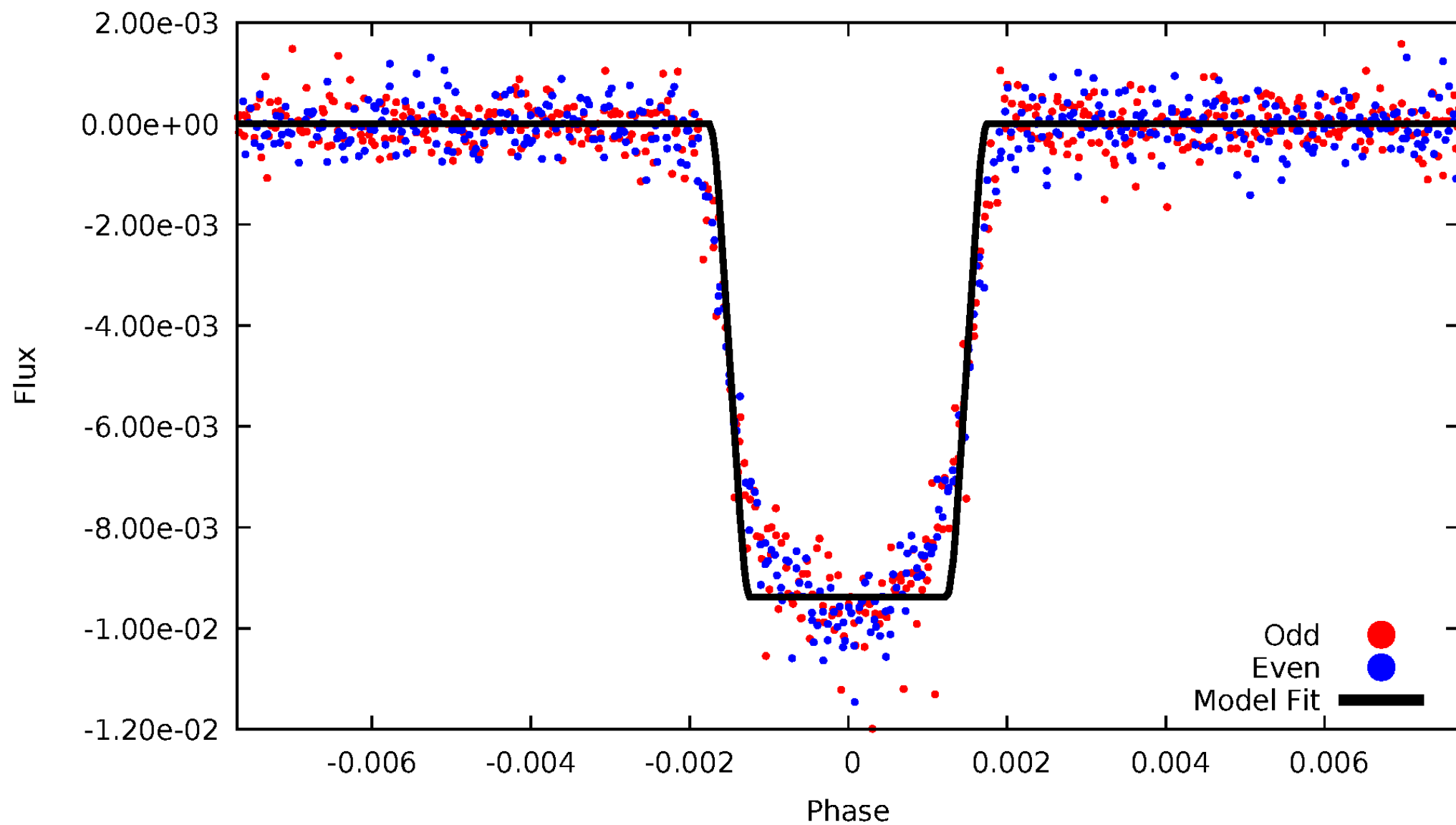
# DV Odd/Even

TCE 009946525-01



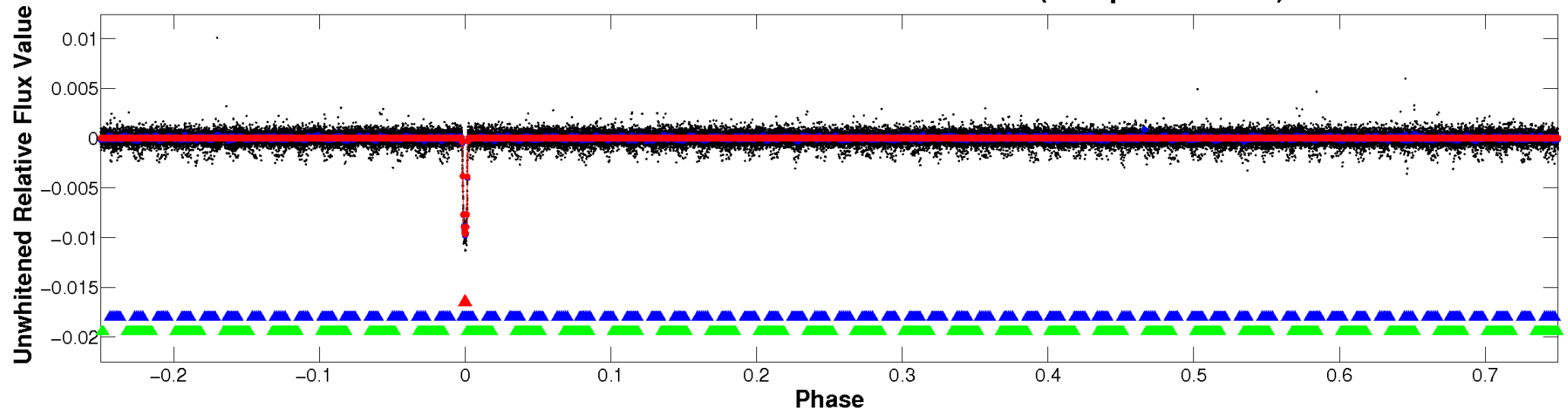
# ALT Odd/Even

TCE 009946525-01

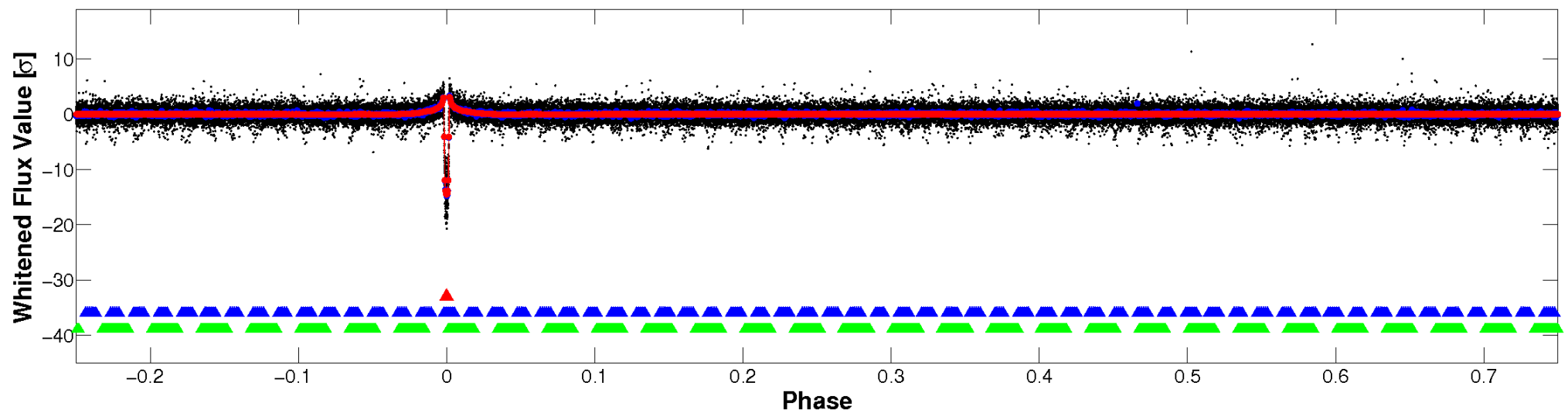


# Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

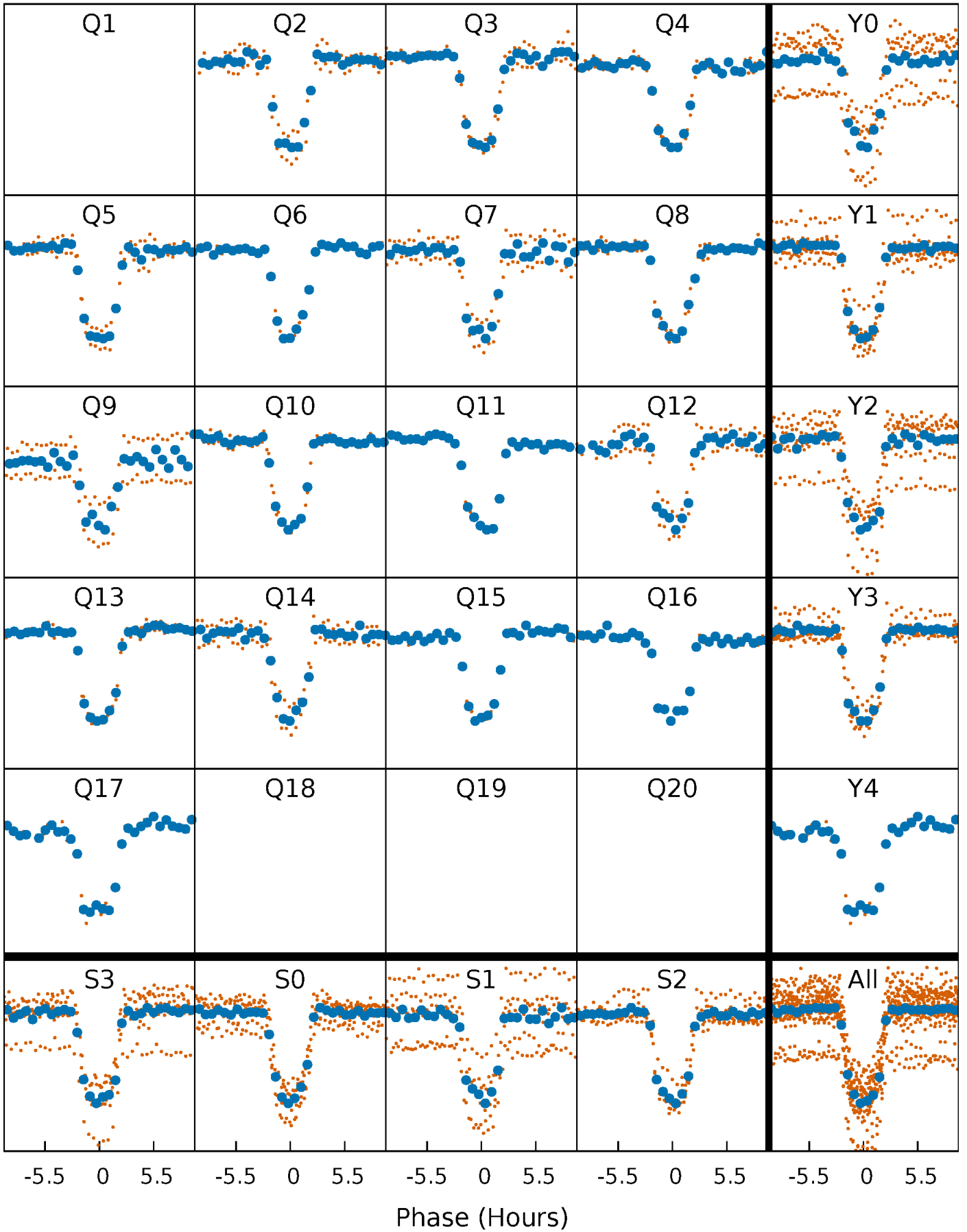


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

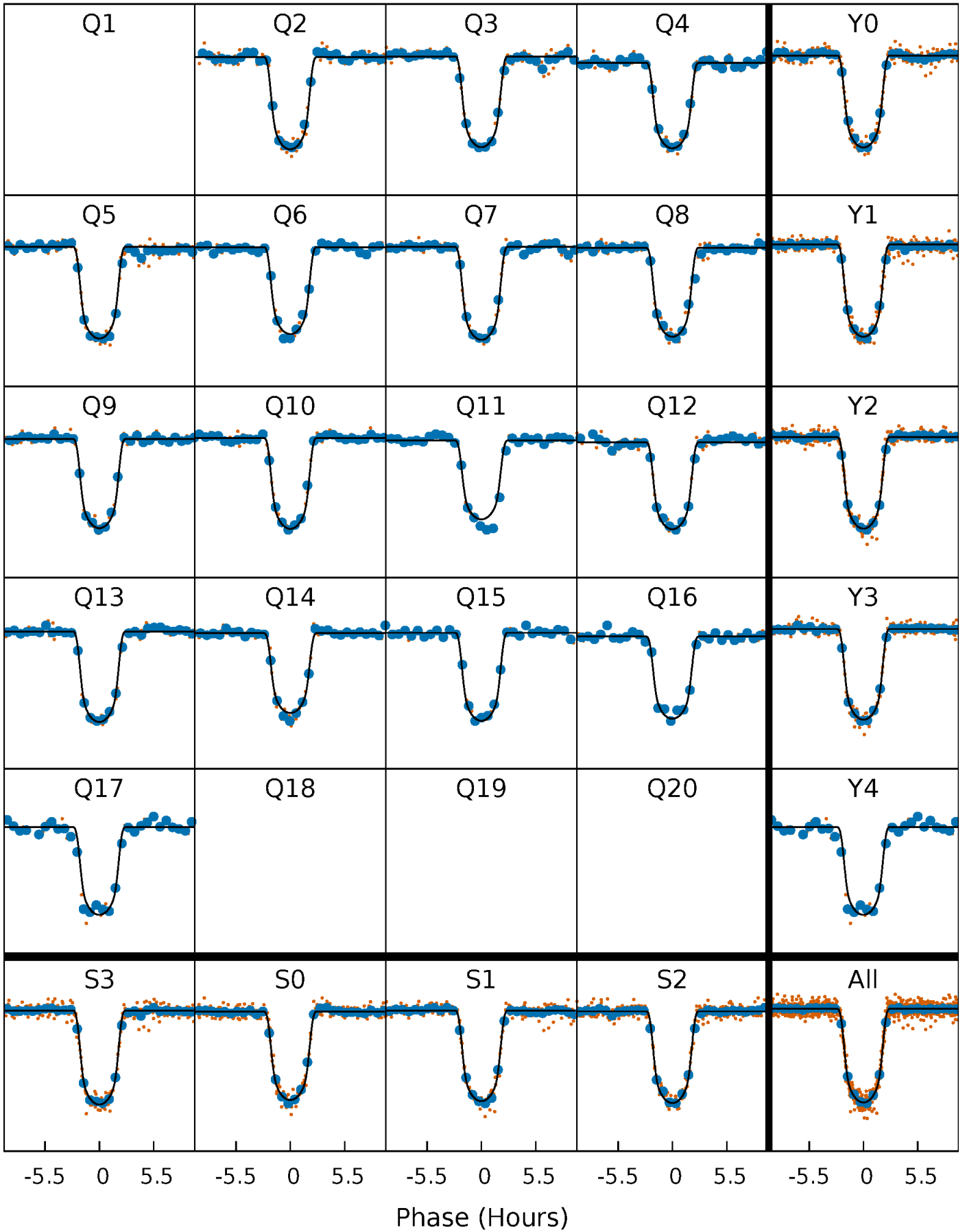
TCE 009946525-01 P= 51.846917 Days  $T_0=170.080573$  (BKJD)





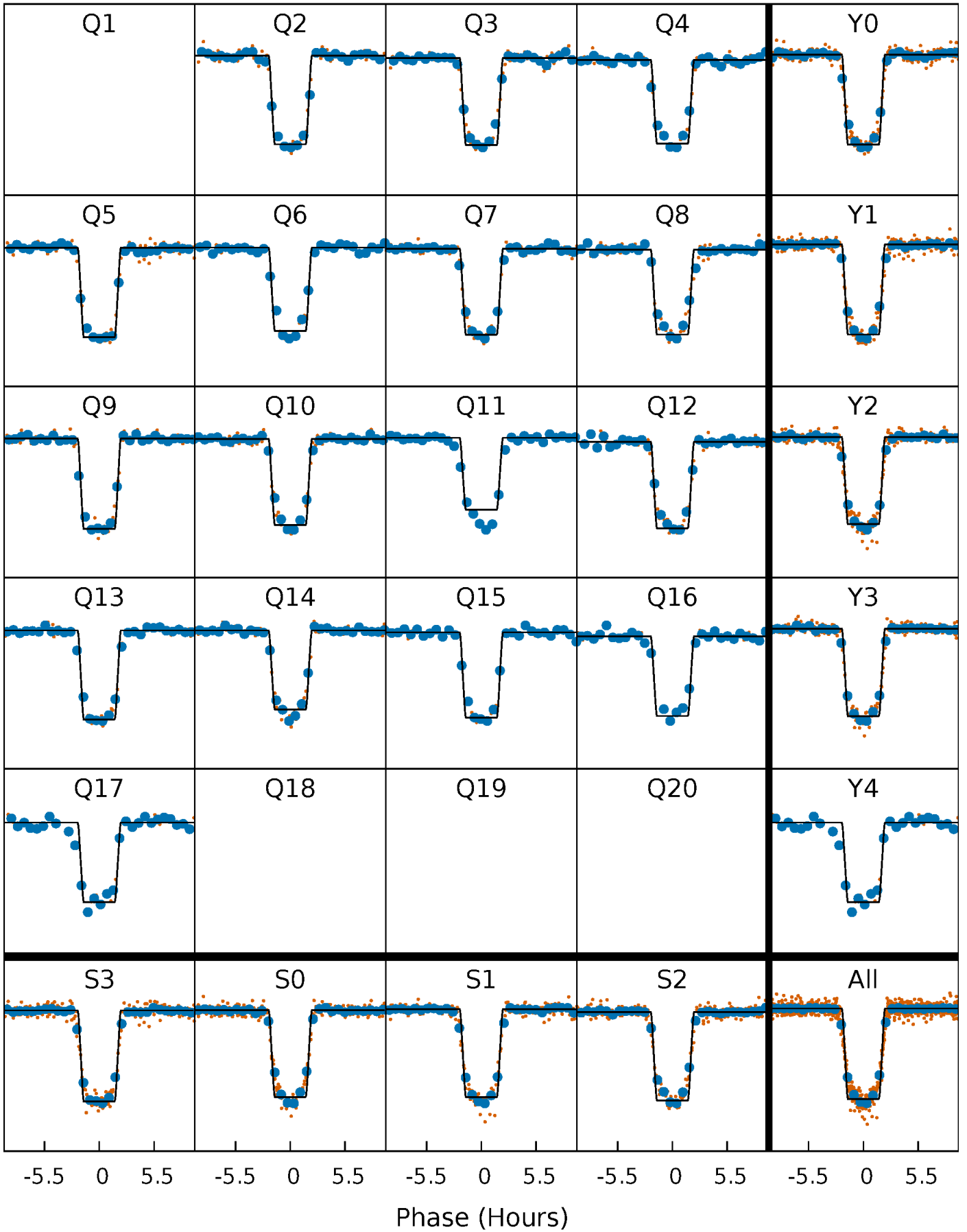
# DV Quarter-Phased Transit Curves

TCE 009946525-01 P= 51.846917 Days  $T_0=170.080573$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

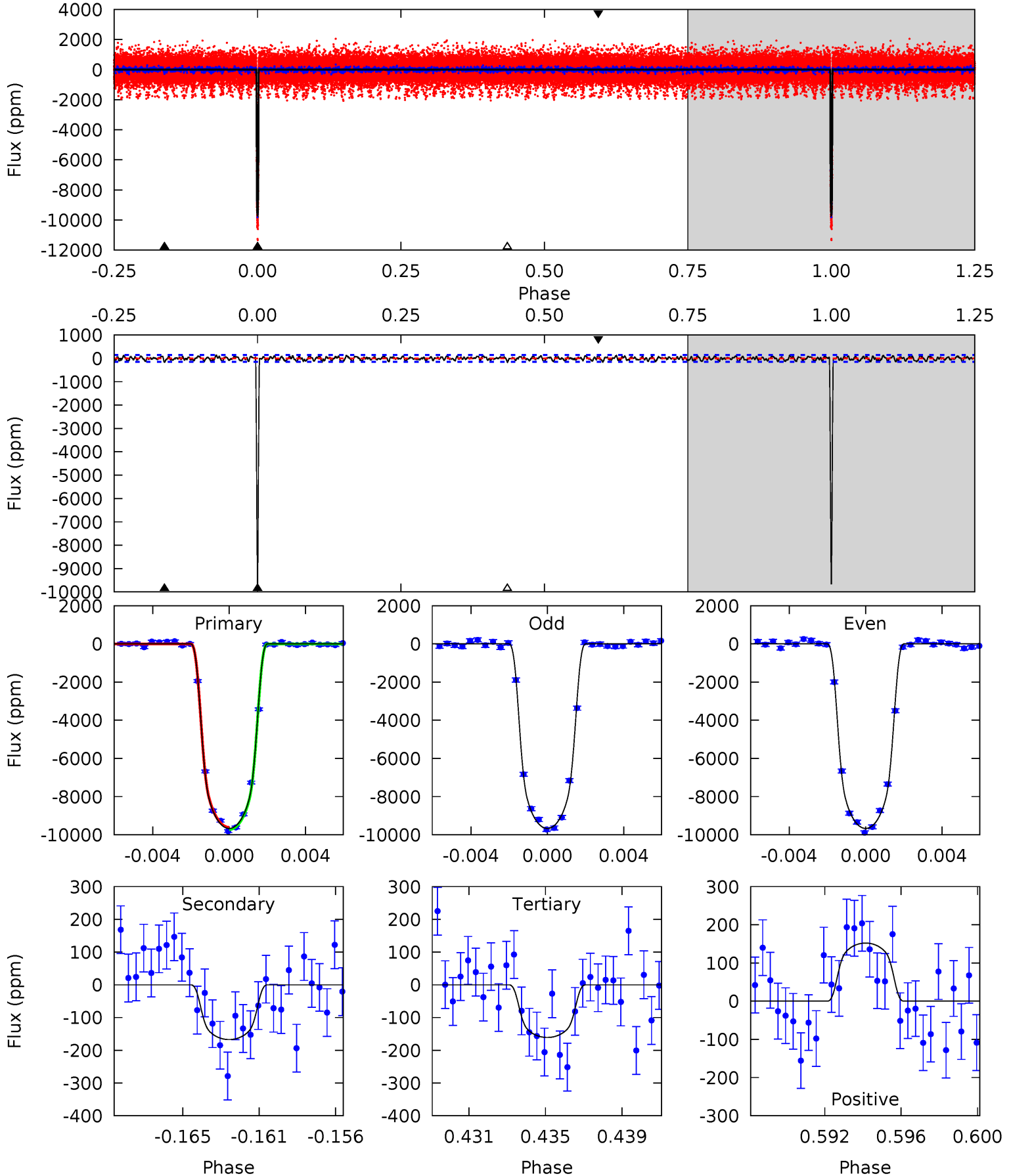
TCE 009946525-01 P= 51.846873 Days  $T_0=170.081097$  (BKJD)



# DV Model-Shift Uniqueness Test

009946525-01, P = 51.846917 Days, E = 118.233656 Days

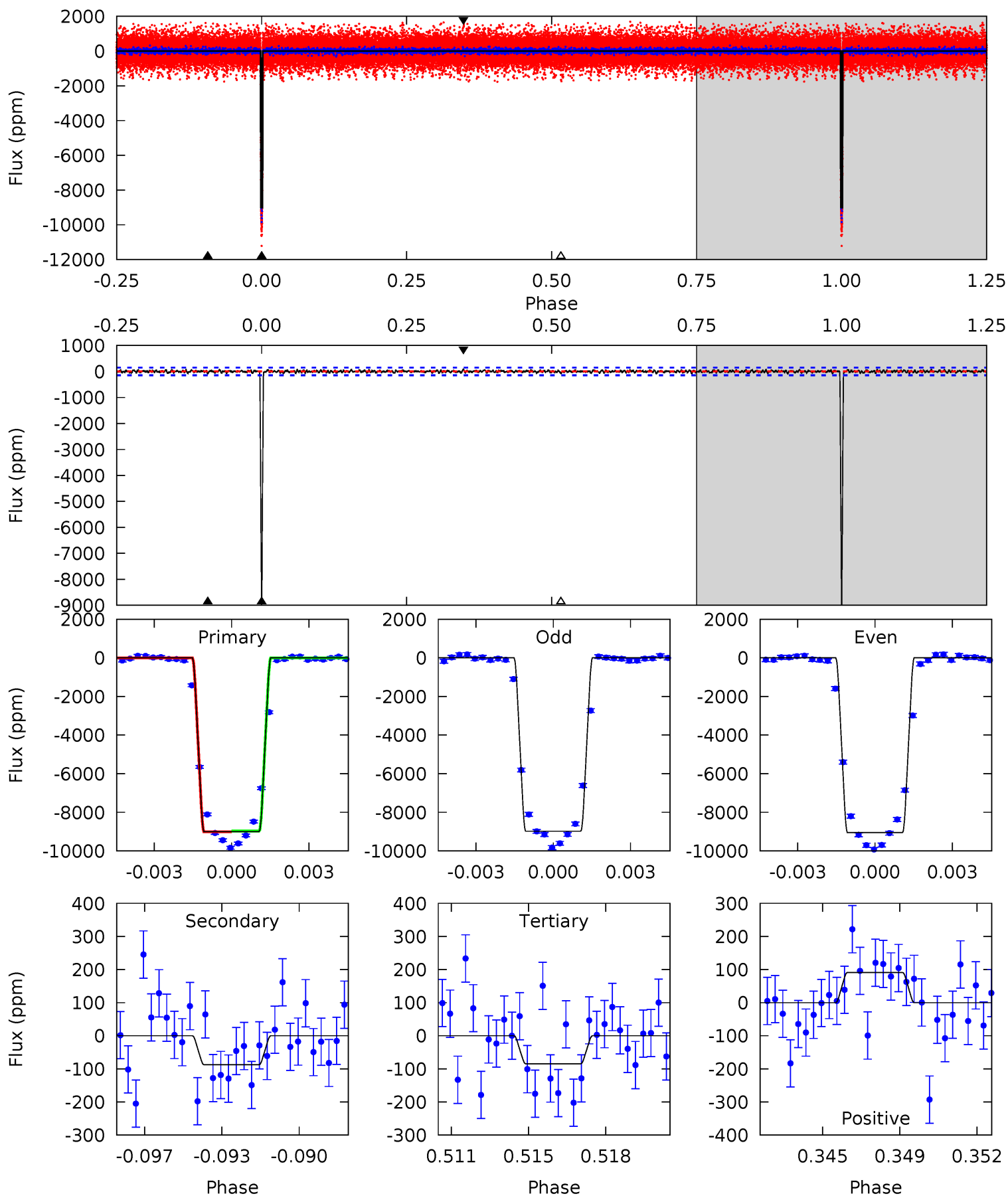
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
336.7	5.82	5.60	5.30	5.19	2.86	1.98	331.1	331.4	0.22	0.53	0.00	1.01	0.02	1.95



# Alt Model-Shift Uniqueness Test

009946525-01, P = 51.846873 Days, E = 118.234224 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
321.8	3.12	3.02	3.25	5.23	2.92	0.98	318.7	318.5	0.10	-0.13	1.28	1.01	0.01	0.75



### Stellar Parameters For KIC 009946525

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5227^{+73}_{-83}$	$4.535^{+0.033}_{-0.066}$	$0.140^{+0.150}_{-0.150}$	$0.838^{+0.068}_{-0.040}$	$0.876^{+0.041}_{-0.050}$	$2.100^{+0.269}_{-0.421}$
	+1%/-2%	+1%/-1%	+107%/-107%	+8%/-5%	+5%/-6%	+13%/-20%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009946525-01 / KOI 0398.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-167 \pm 29$	$8.87^{+0.44}_{-0.27}$	$580^{+13}_{-12}$	$2680^{+61}_{-72}$	$78^{+15}_{-15}$
Alt.	$-87 \pm 28$	$8.88^{+0.44}_{-0.28}$	$580^{+14}_{-14}$	$2467^{+92}_{-110}$	$41^{+13}_{-14}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming A=0.3)

$A_{obs}$  = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

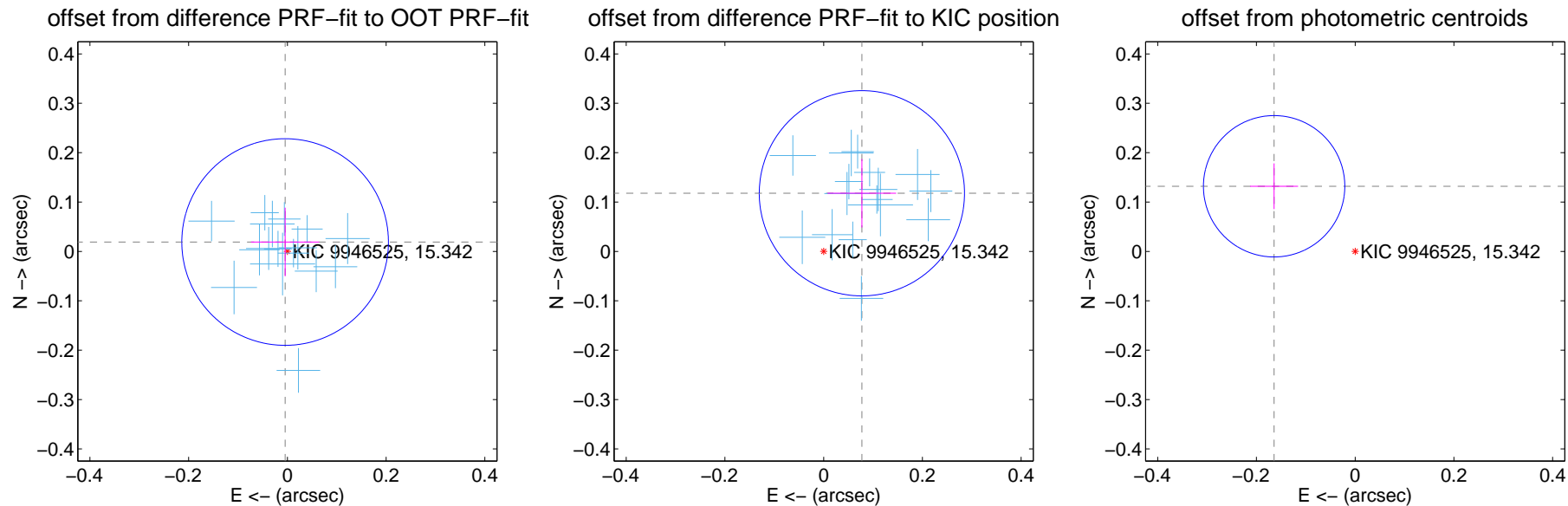
## DV Centroid Data

Supplemental centroid analysis for 009946525-01. Kepler magnitude: 15.34. Transit SNR 189.44

There are 16 quarters with good PRF difference image offsets

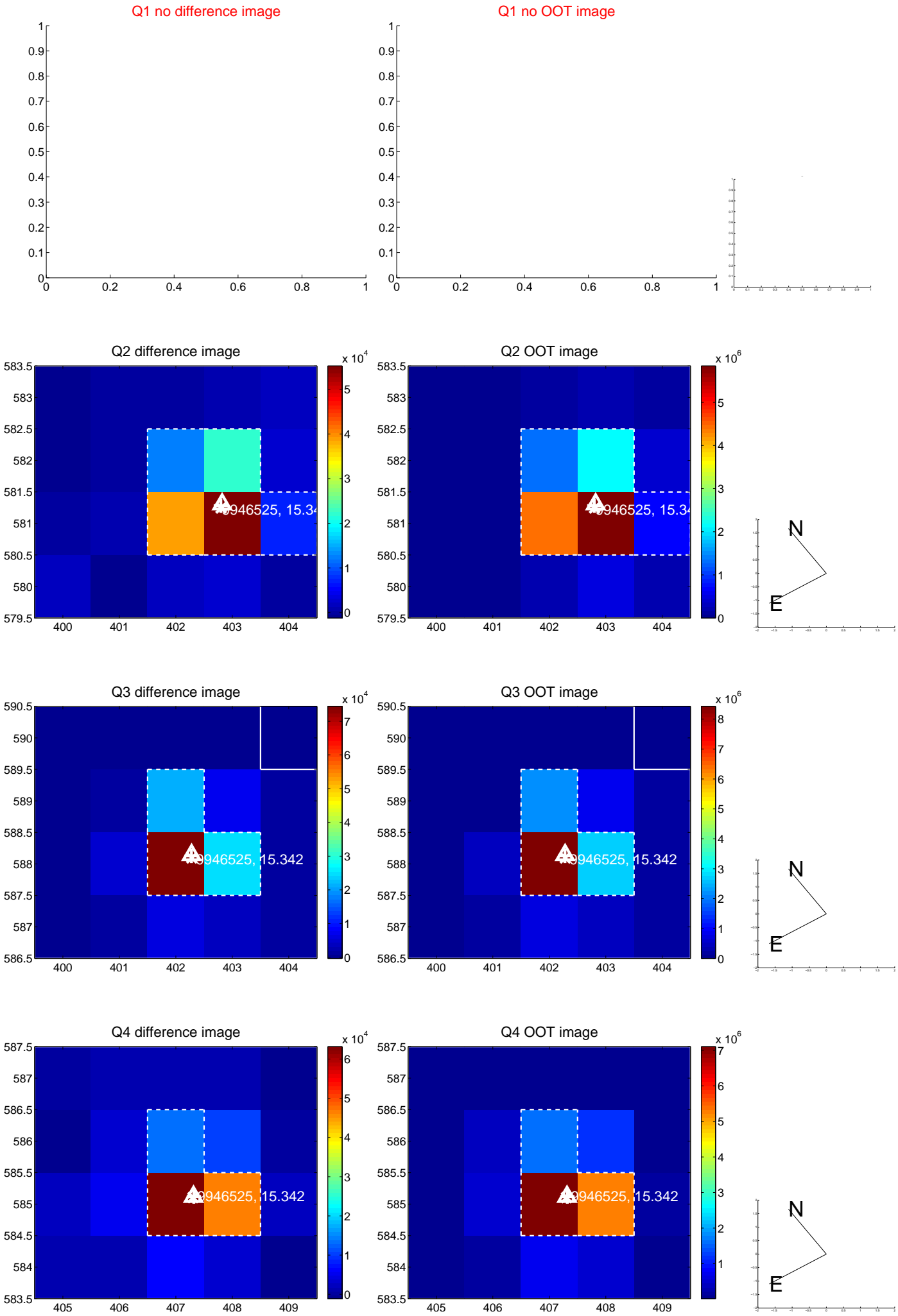
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.020 \pm 0.070$	0.28	$0.005 \pm 0.069$	$0.019 \pm 0.069$
PRF-fit source offset from KIC position	$0.141 \pm 0.069$	2.03	$-0.077 \pm 0.069$	$0.118 \pm 0.069$
photometric centroid source offset	$0.21 \pm 0.05$	4.41	$0.16 \pm 0.05$	$0.13 \pm 0.05$

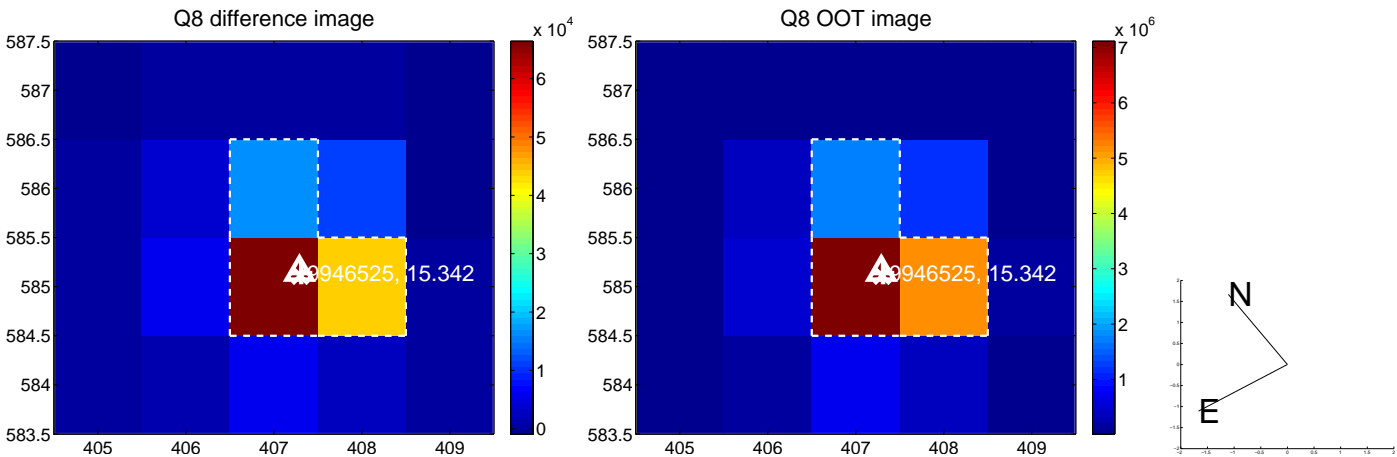
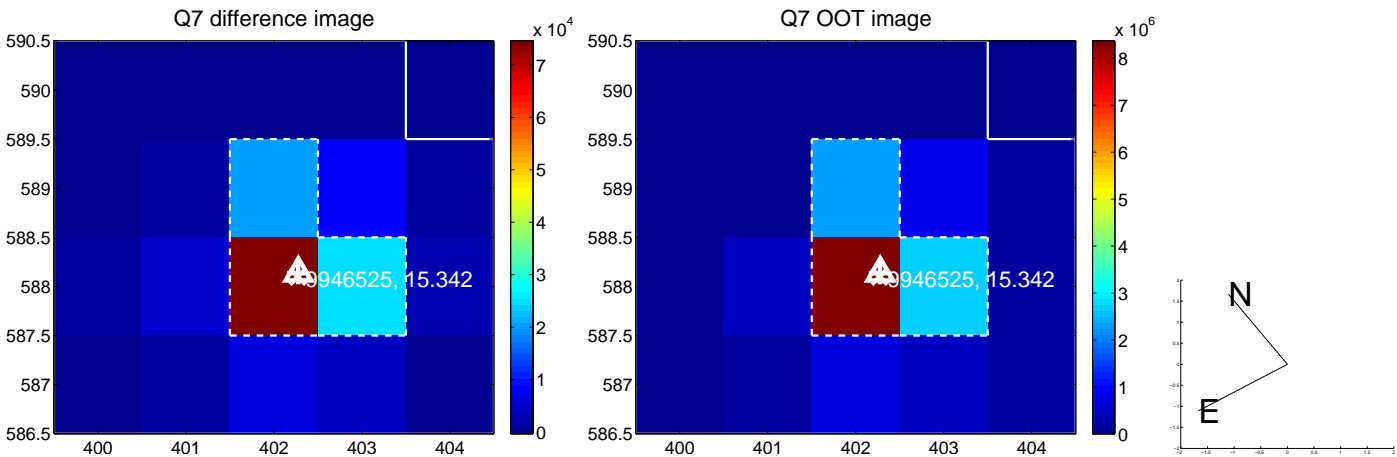
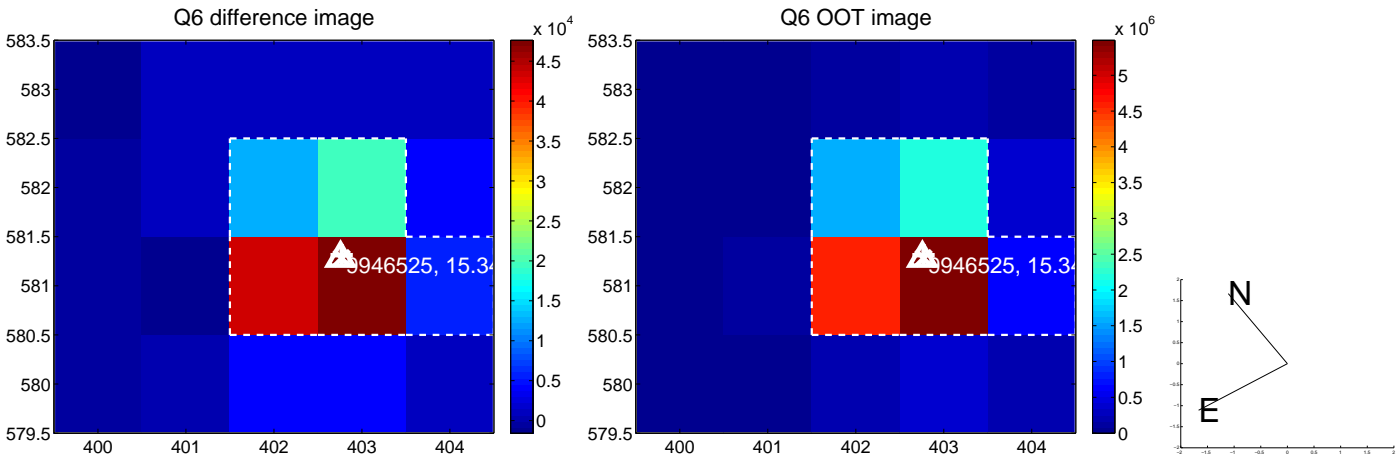
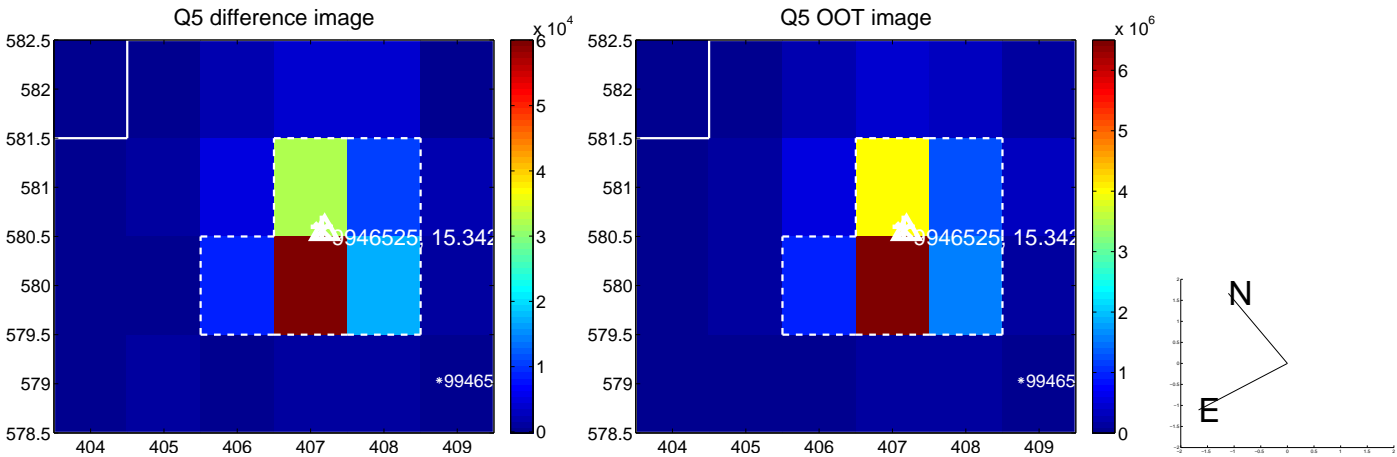


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

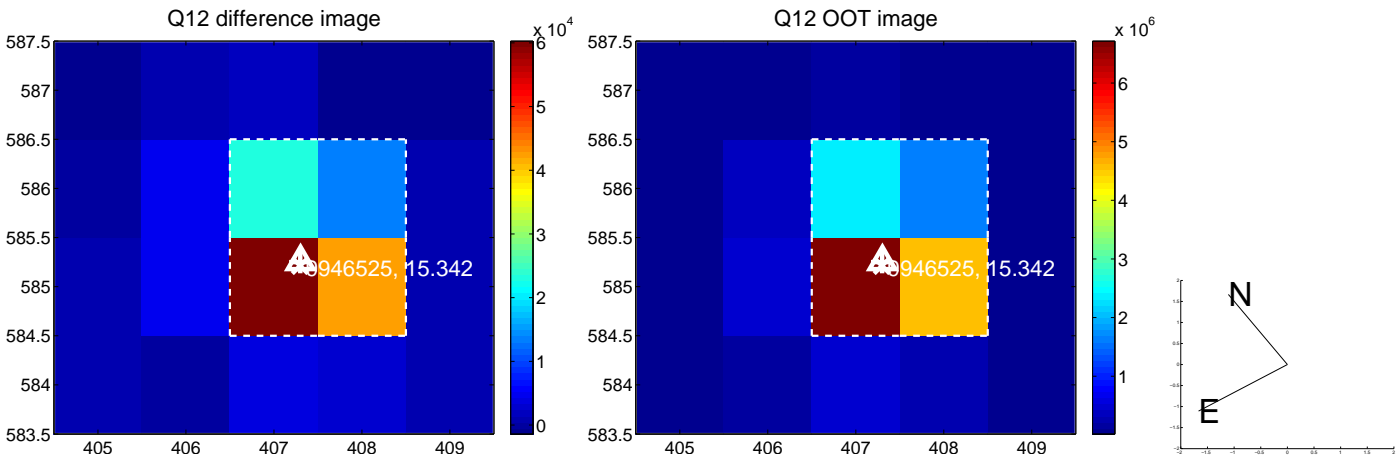
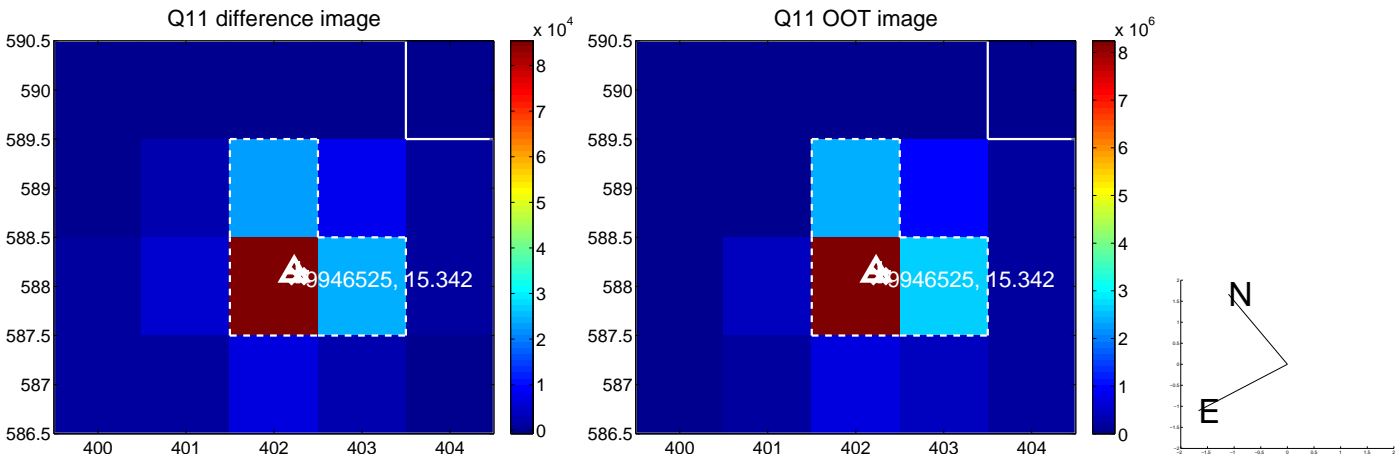
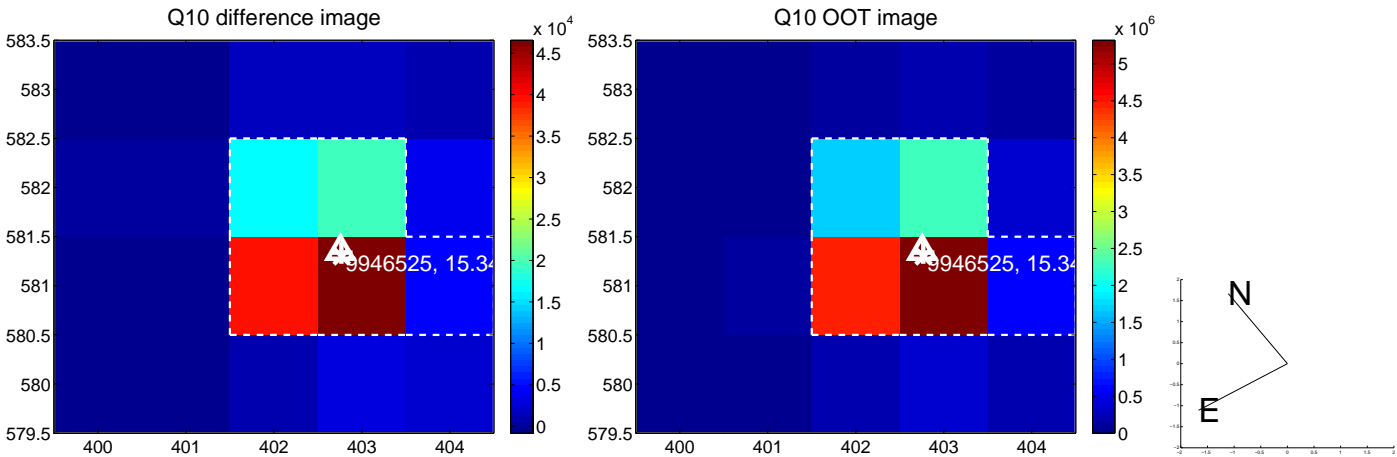
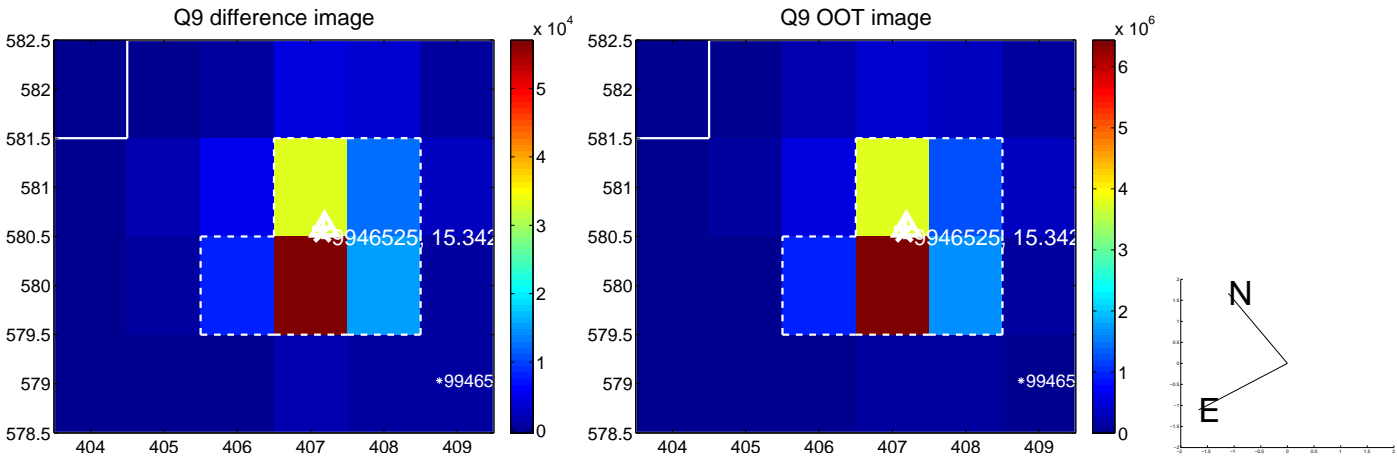


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

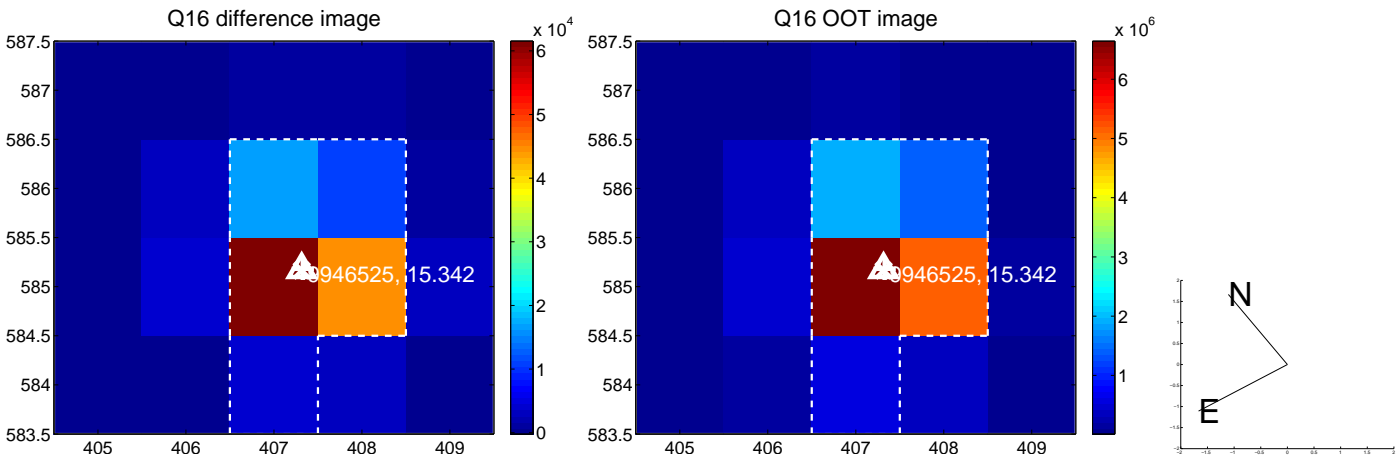
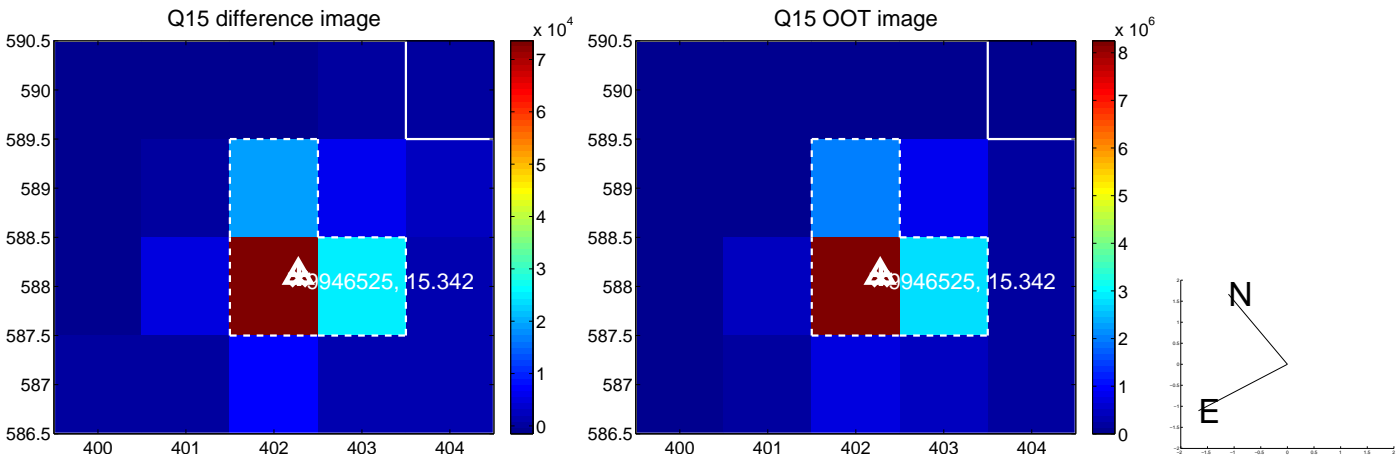
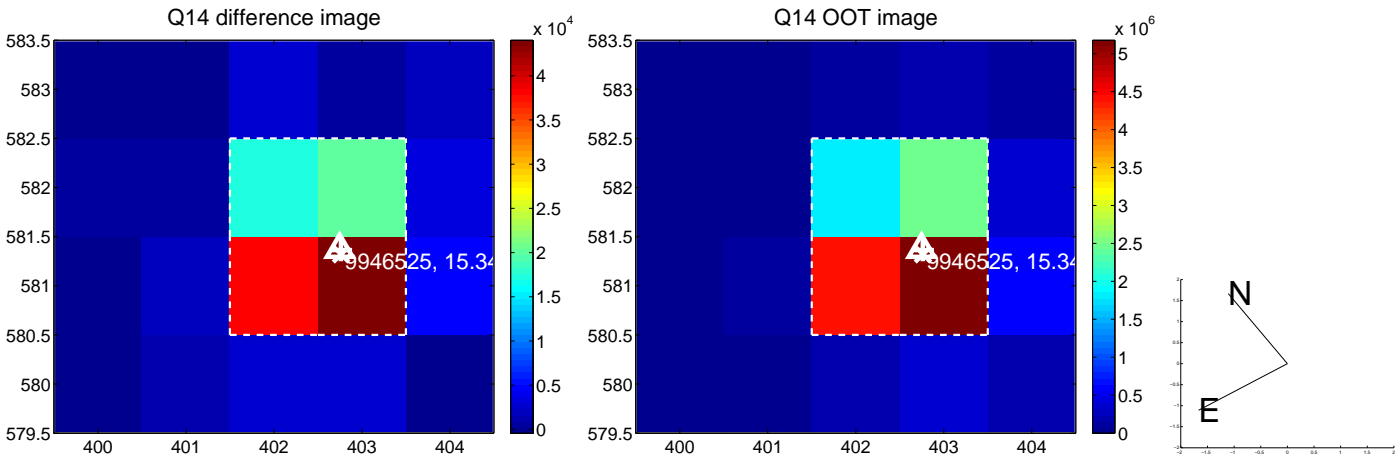
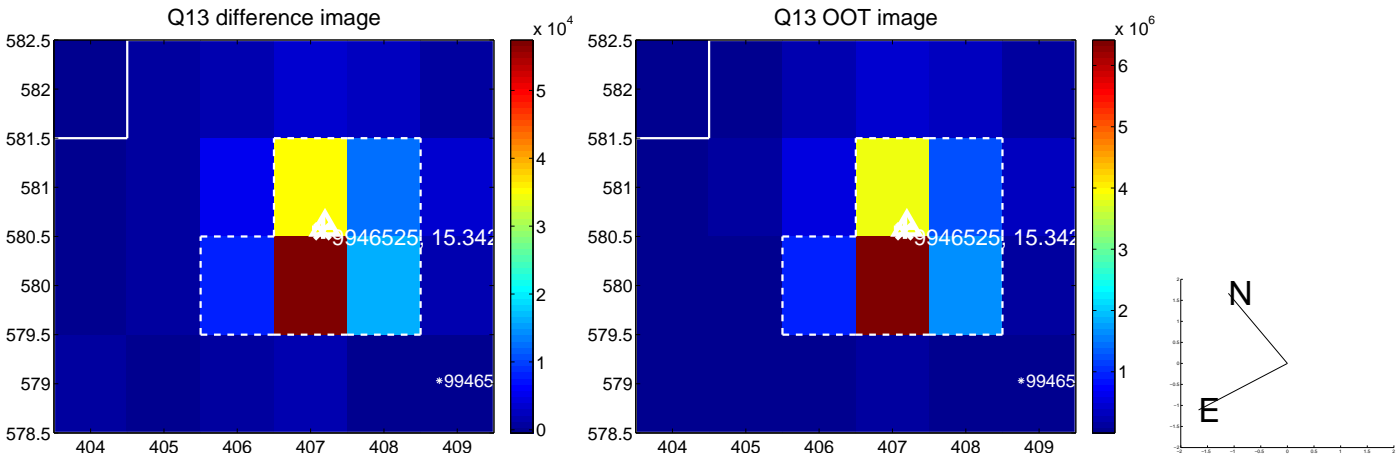




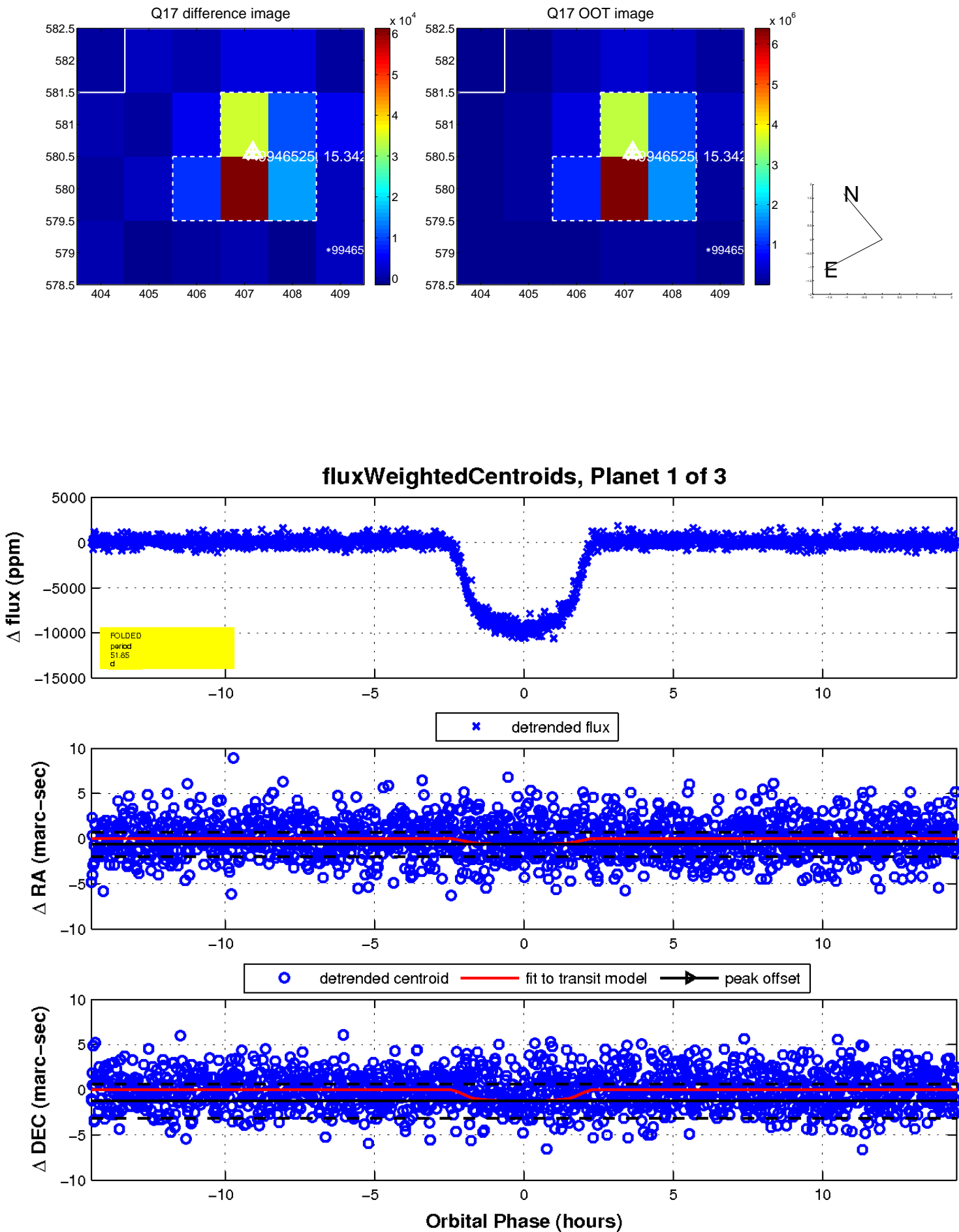
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

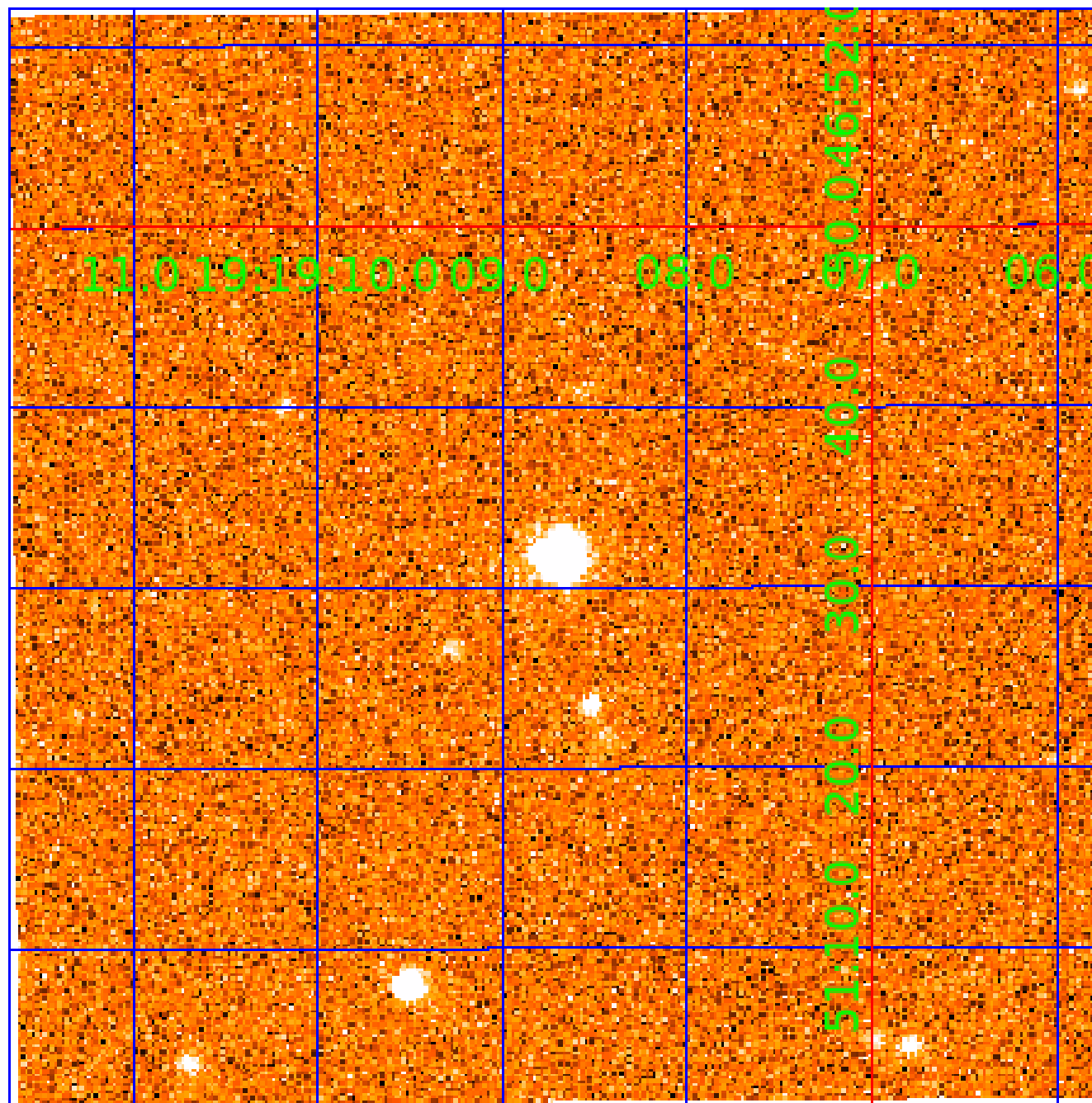


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 009946525

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009946525-01	OBS	0398.01	51.846917	170.080573	9676.3	4.832	188.1	189.4	0.84	5227	8.85	6.92
009946525-02	OBS	0398.02	4.180047	131.919048	1764.6	2.559	102.8	109.5	0.84	5227	3.88	198.53
009946525-03	OBS	0398.03	1.729356	132.093511	458.6	1.852	36.4	40.8	0.84	5227	2.18	644.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009946525-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009946525-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009946525-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

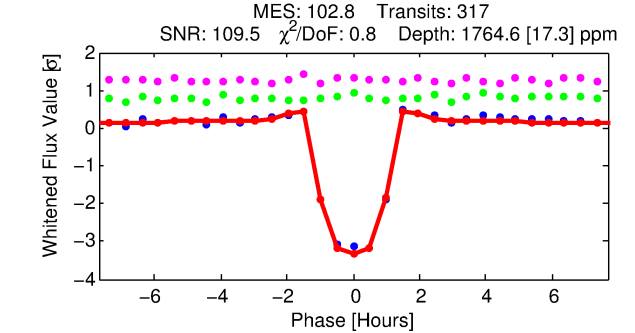
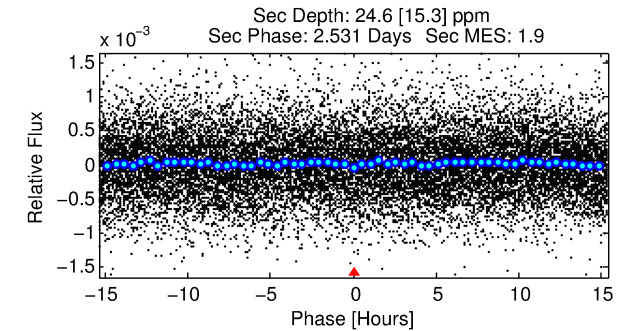
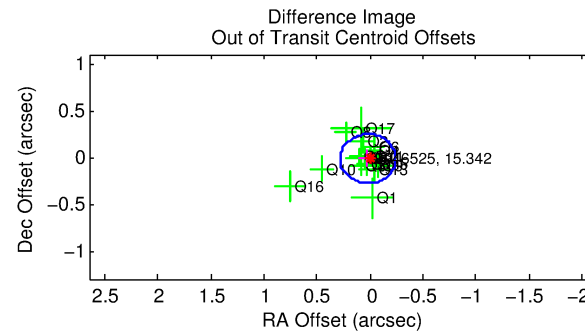
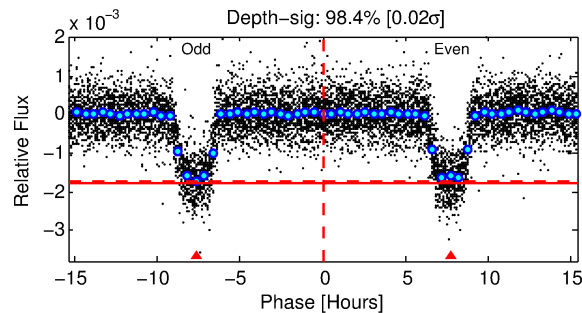
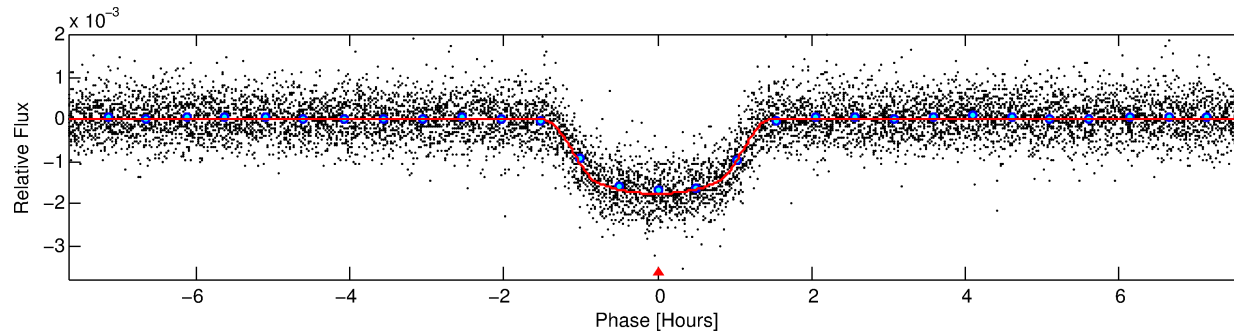
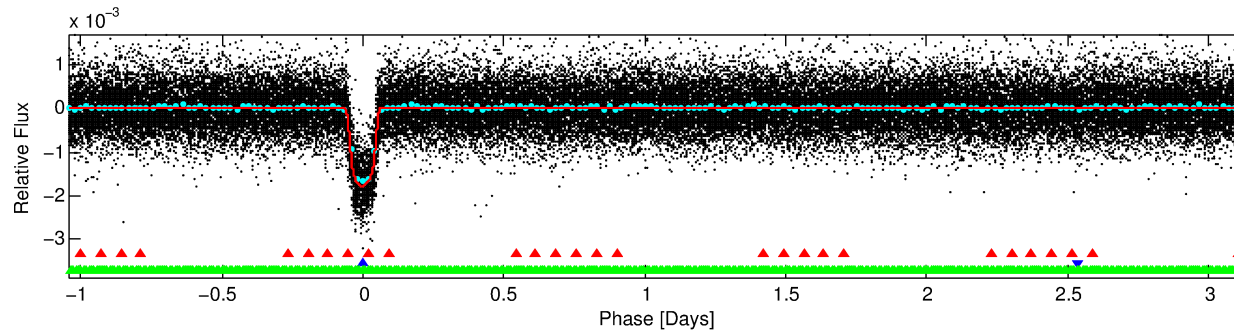
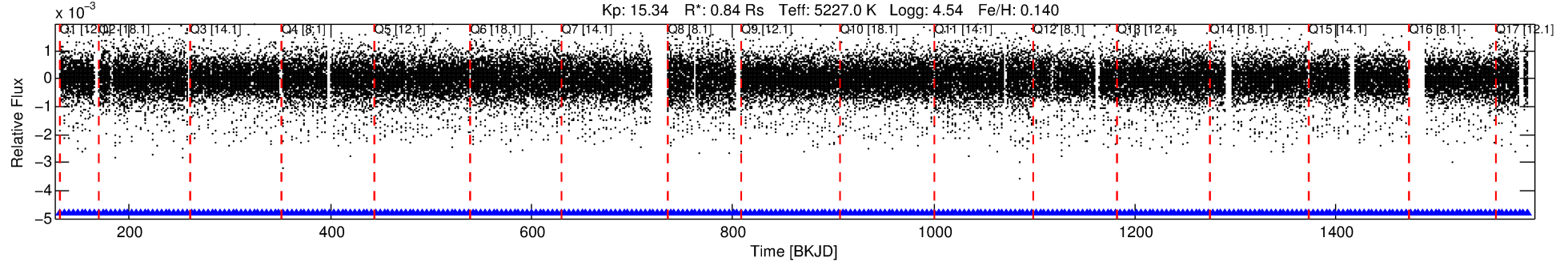
Ephemeris Match Information For 009946525-02

No Significant Match Found

# DV One-Page Summary

KIC: 9946525 Candidate: 2 of 3 Period: 4.180 d  
KOI: K00398.02 Name: Kepler-148c Corr: 0.982

Kp: 15.34 R\*: 0.84 Rs Teff: 5227.0 K Logg: 4.54 Fe/H: 0.140



## DV Fit Results:

Period = 4.18005 [0.00000] d  
Epoch = 131.9190 [0.0004] BKJD  
Rp/R\* = 0.0425 [0.0025]  
a/R\* = 8.77 [1.83]  
b = 0.77 [0.11]  
Seff = 198.53 [26.06]  
Teq = 957 [31] K  
Rp = 3.88 [0.39] Re  
a = 0.0486 [0.0036] AU  
Ag = 2.13 [1.37] [0.82σ]  
Teffp = 1787 [284] K [2.90σ]

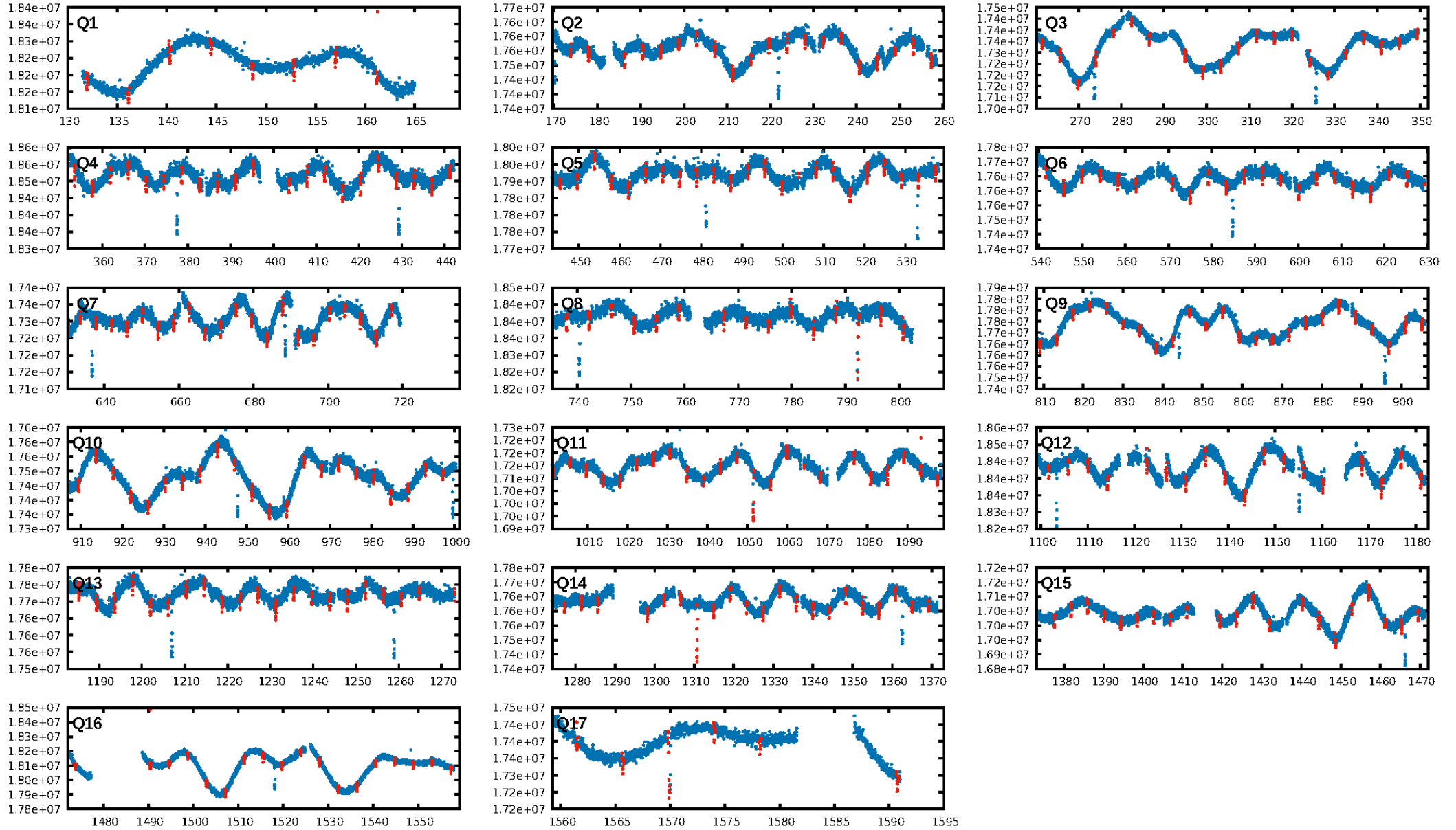
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [18.62σ]  
LongPeriod-sig: 100.0% [209.24σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [304/304]  
GhostDiagnostic-chr: 3.727  
Centroid-sig: 20.5%  
Centroid-so: 0.146 arcsec [1.45σ]  
OotOffset-rm: 0.026 arcsec [0.30σ]  
KicOffset-rm: 0.117 arcsec [1.40σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:05:19 Z

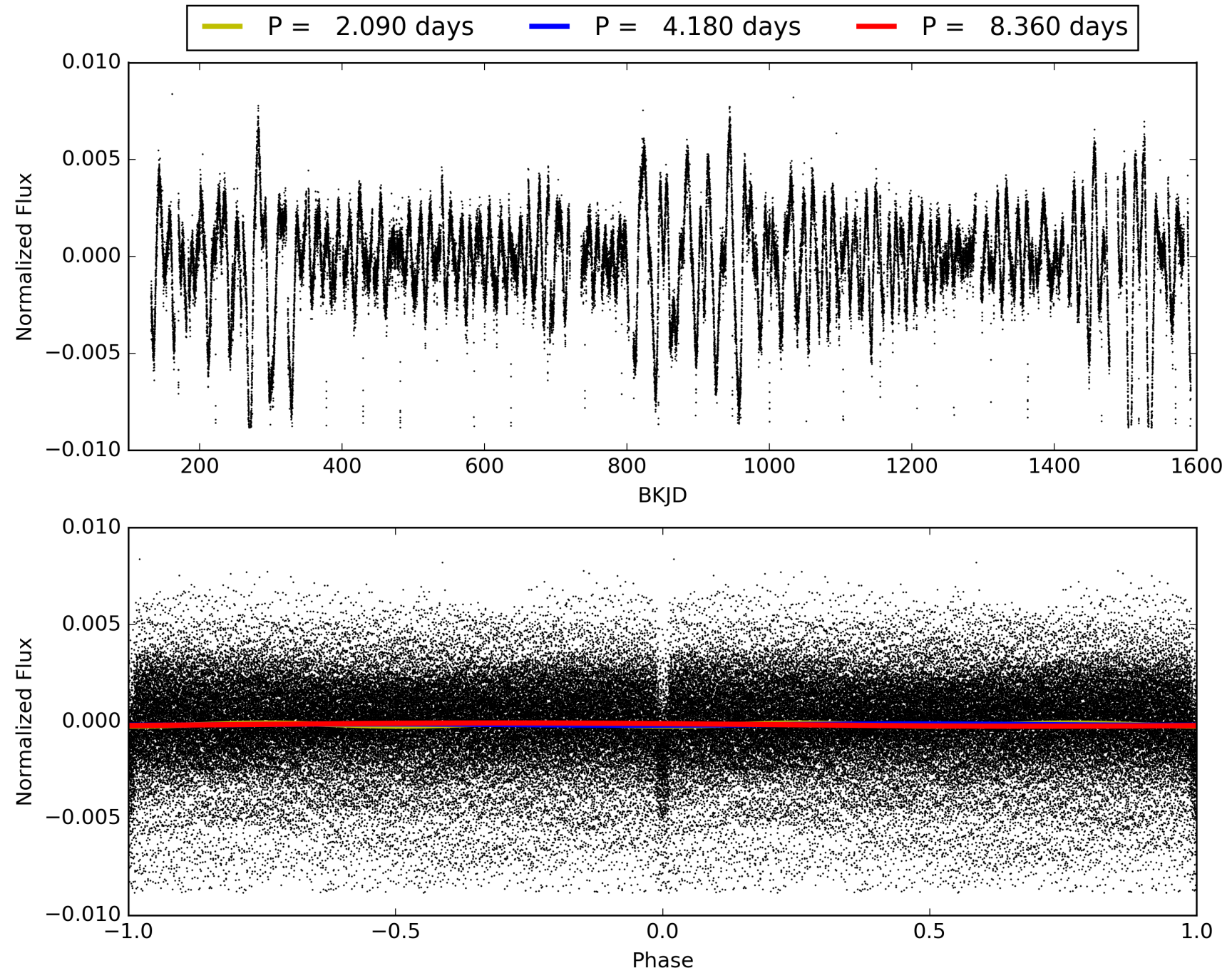
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009946525-02, PDC Light Curves





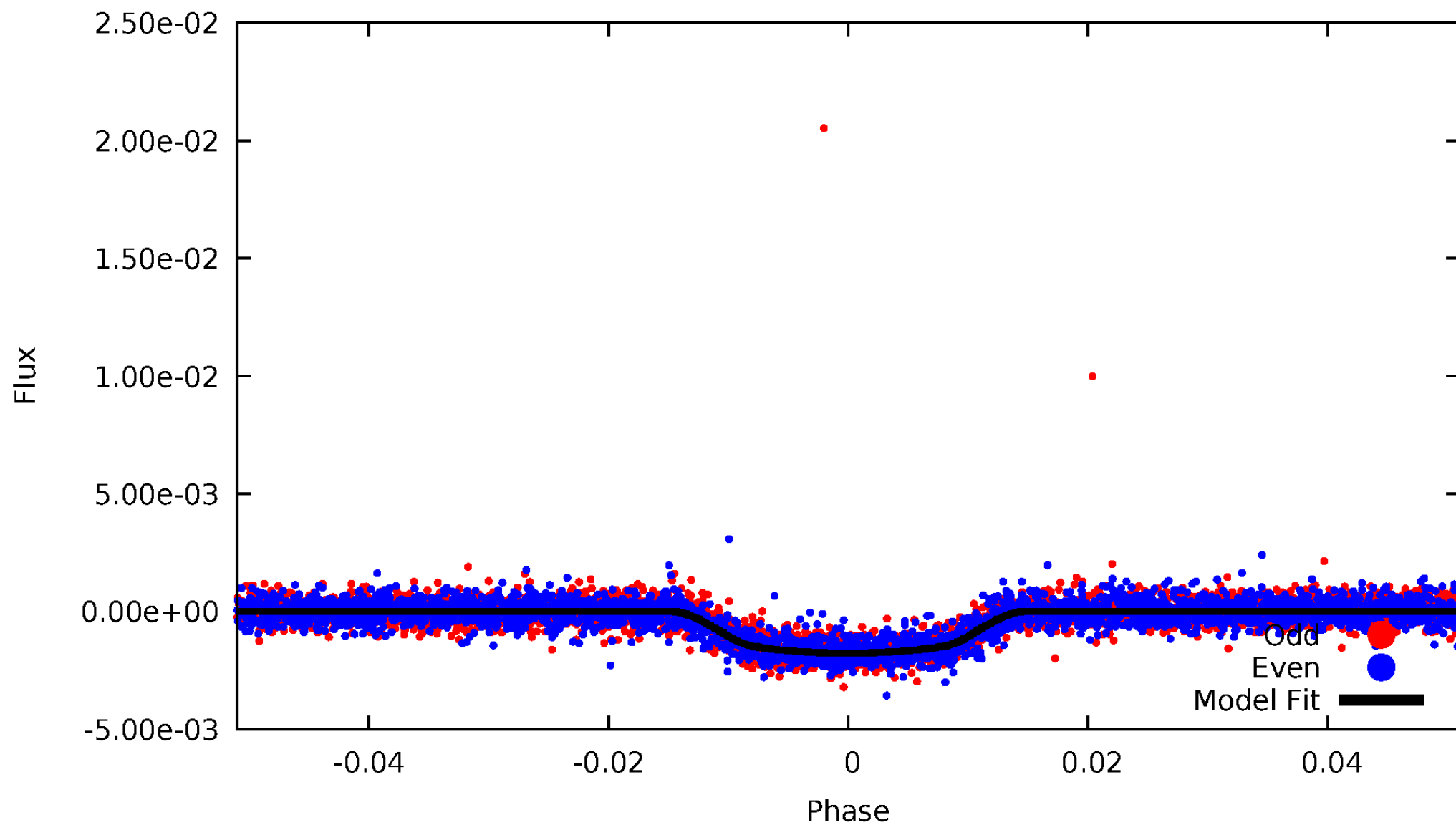
TCE 009946525-02





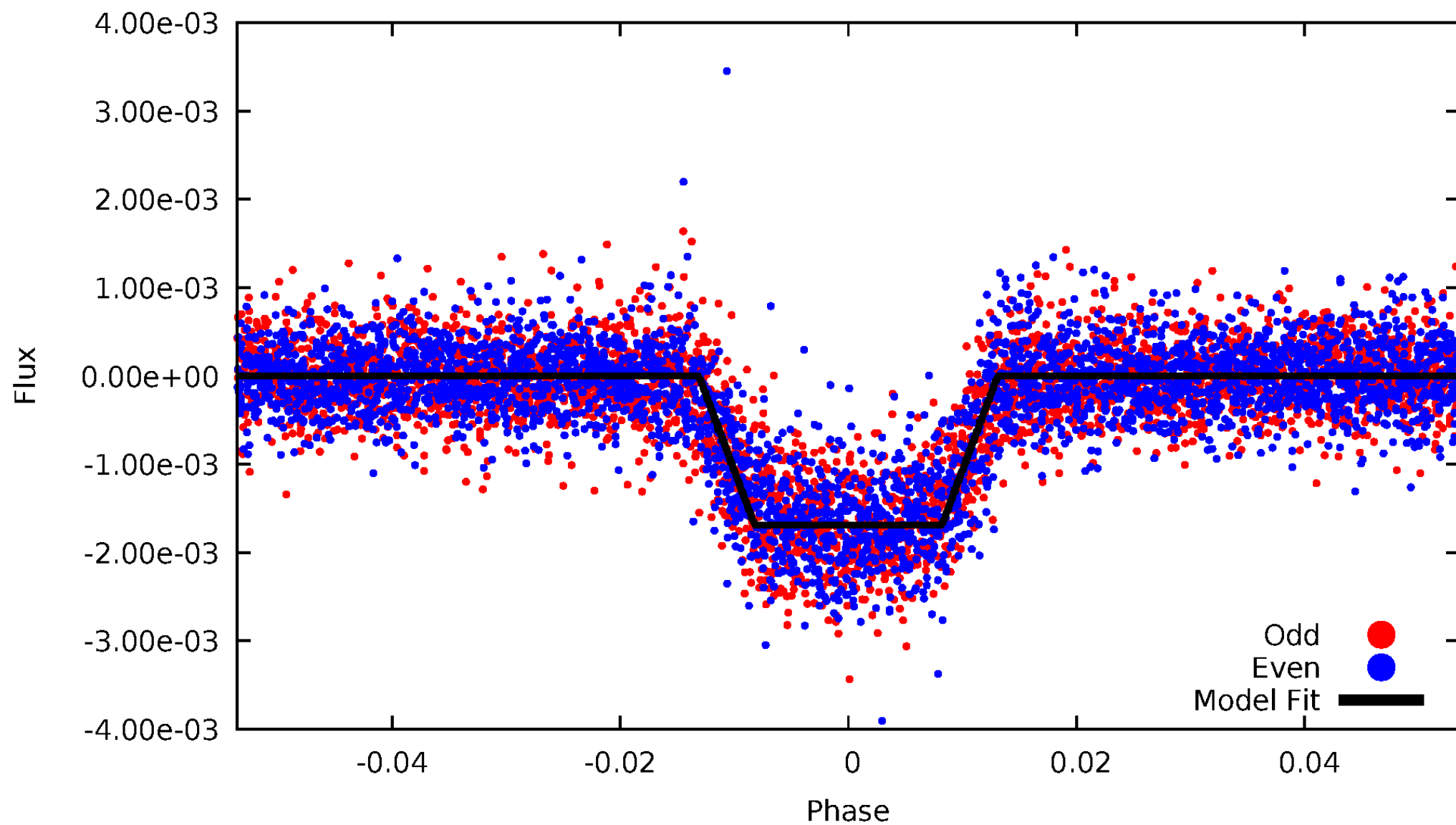
# DV Odd/Even

TCE 009946525-02



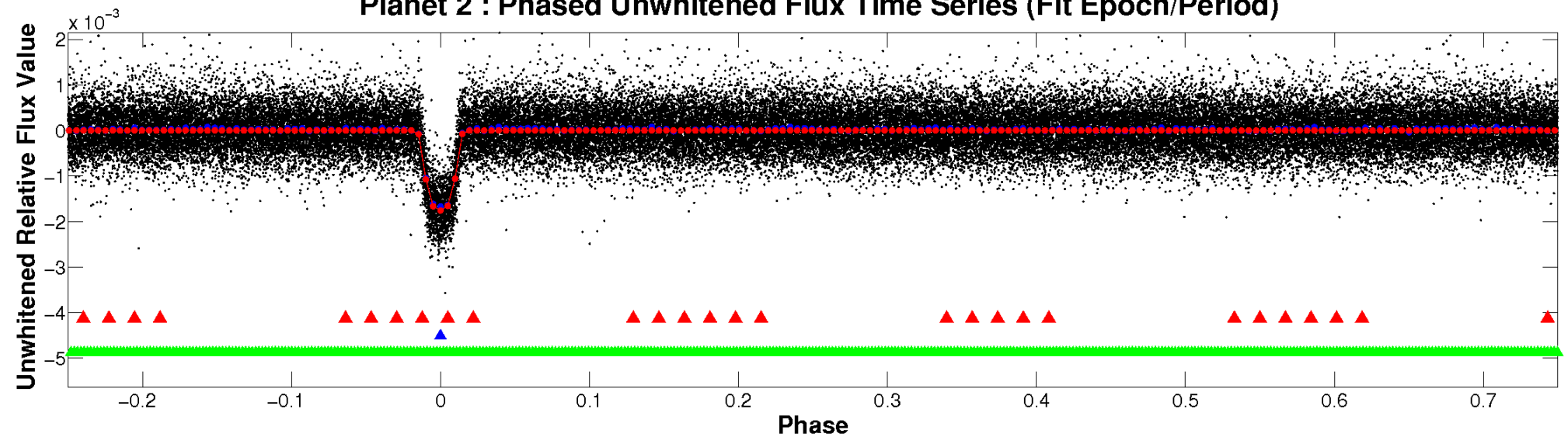
# ALT Odd/Even

TCE 009946525-02

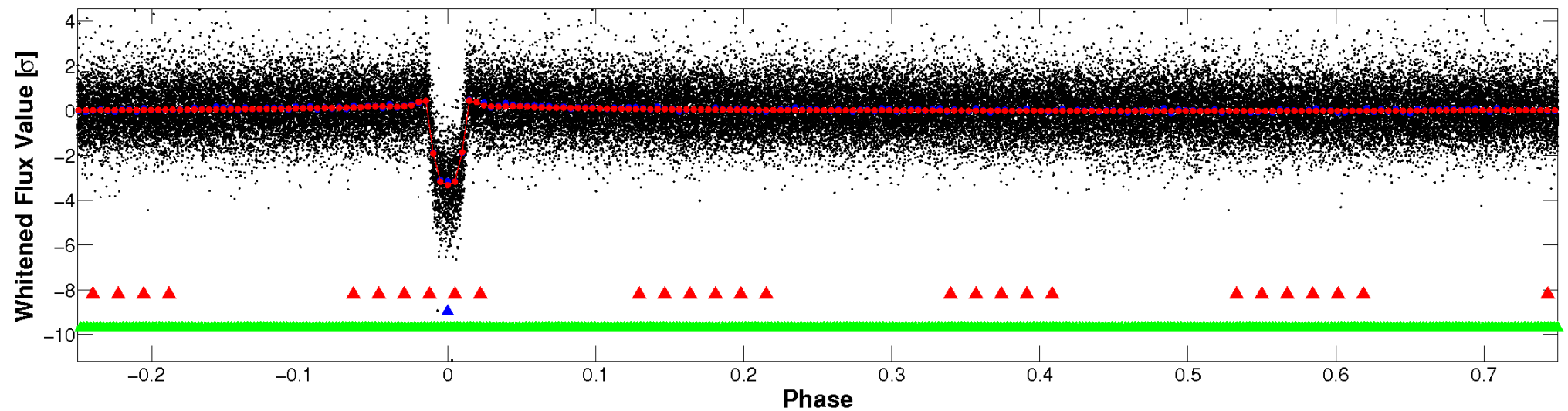


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

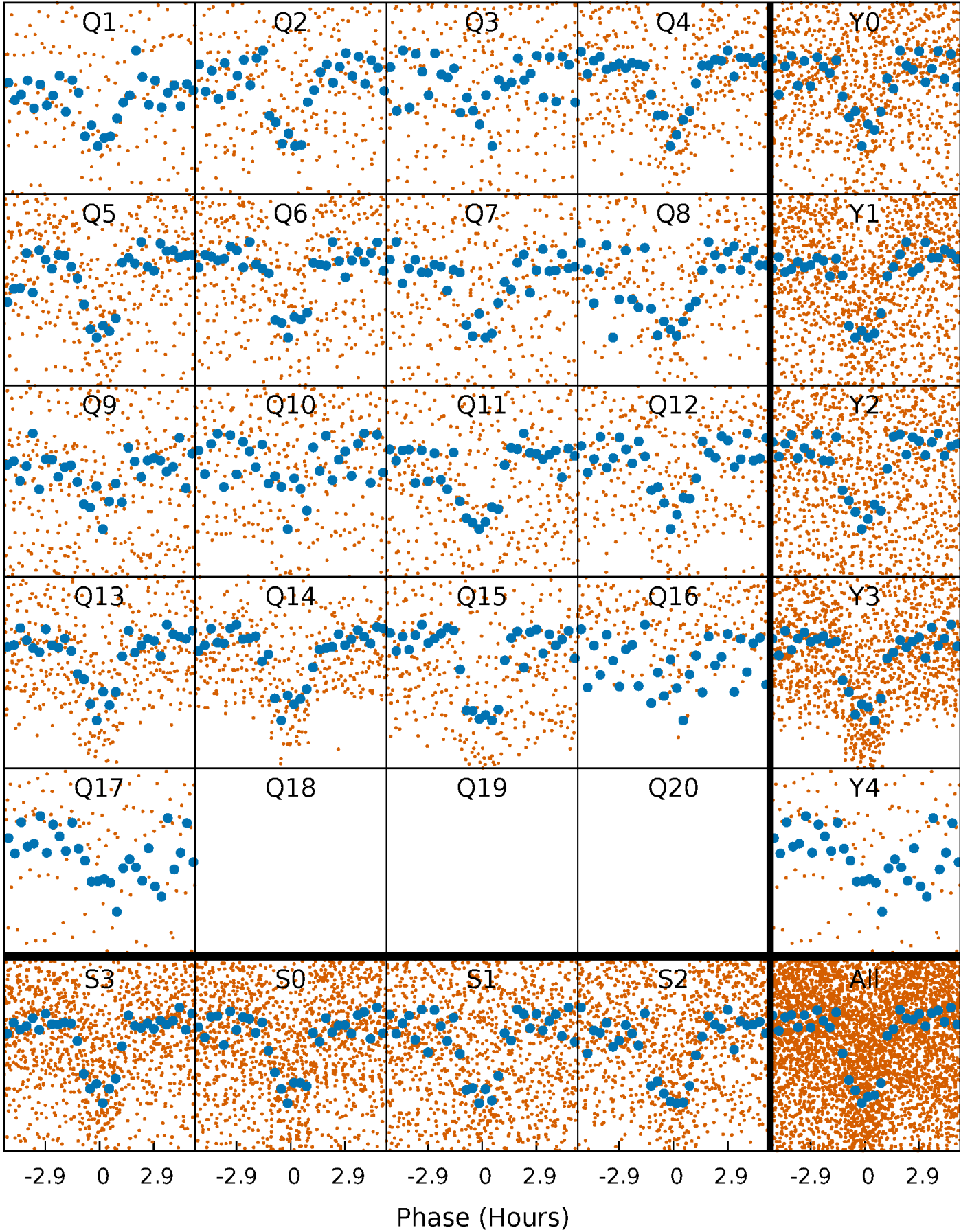


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



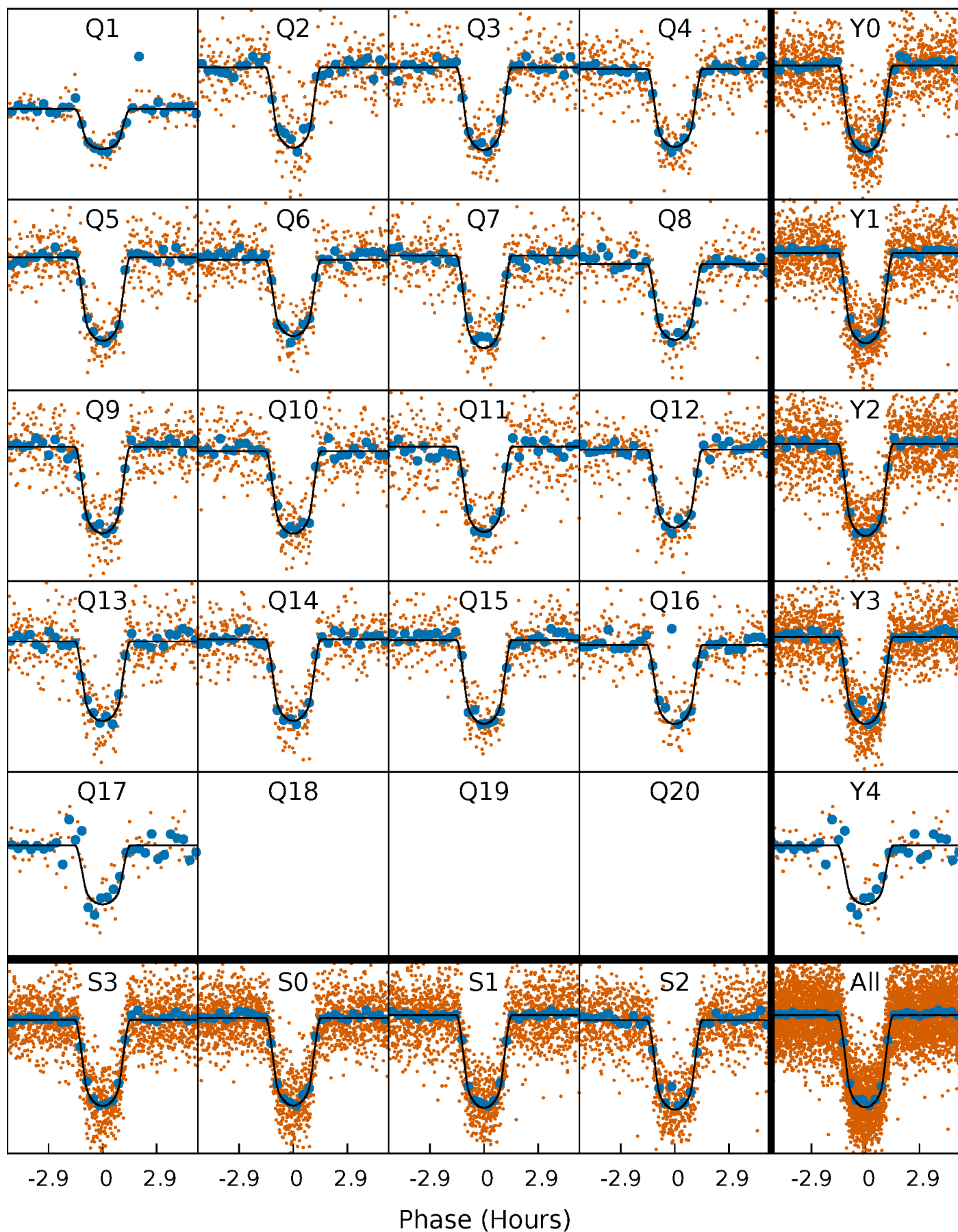
# PDC Quarter-Phased Transit Curves

TCE 009946525-02    P= 4.180047 Days     $T_0=131.919048$  (BKJD)



# DV Quarter-Phased Transit Curves

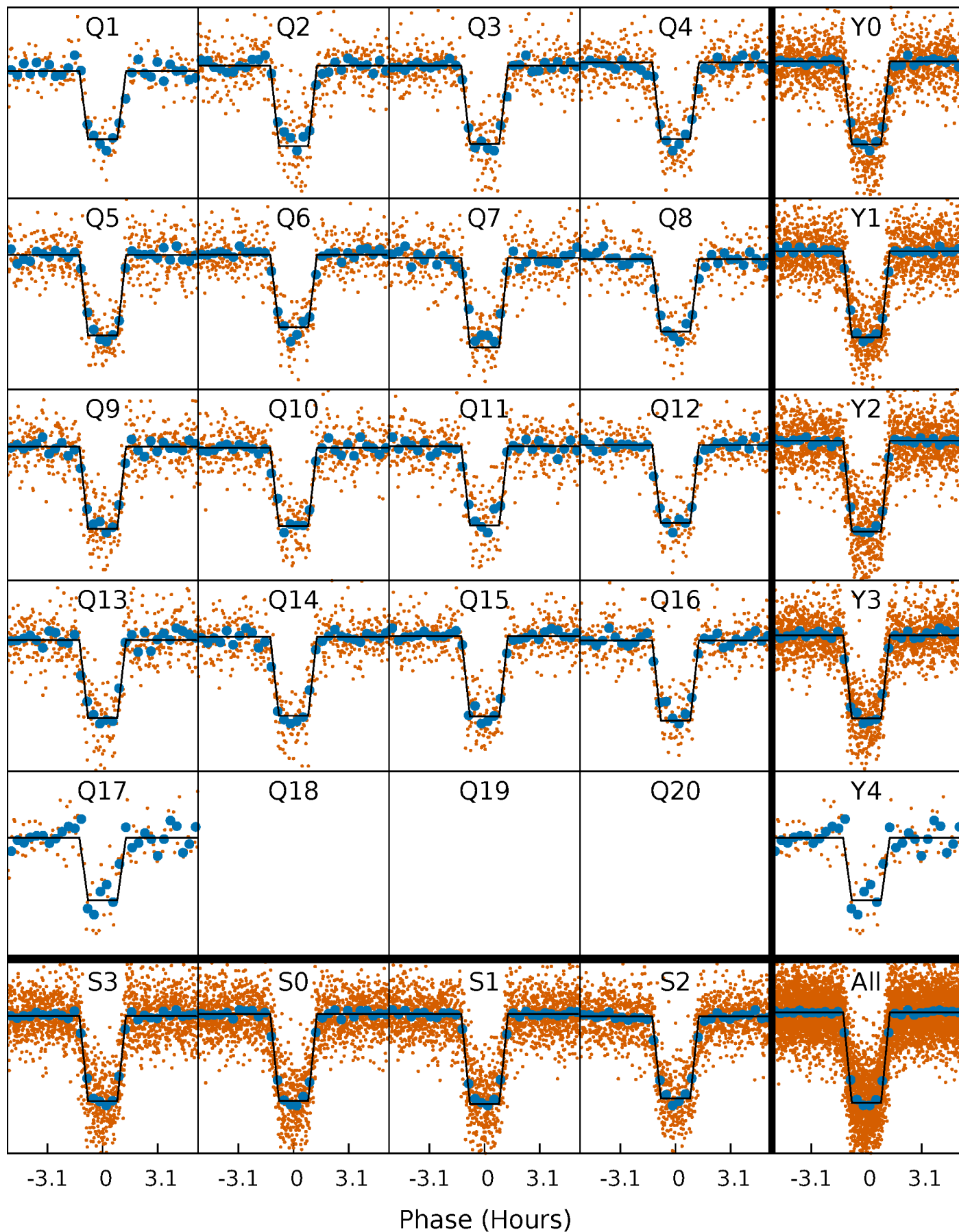
TCE 009946525-02 P= 4.180047 Days  $T_0=131.919048$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

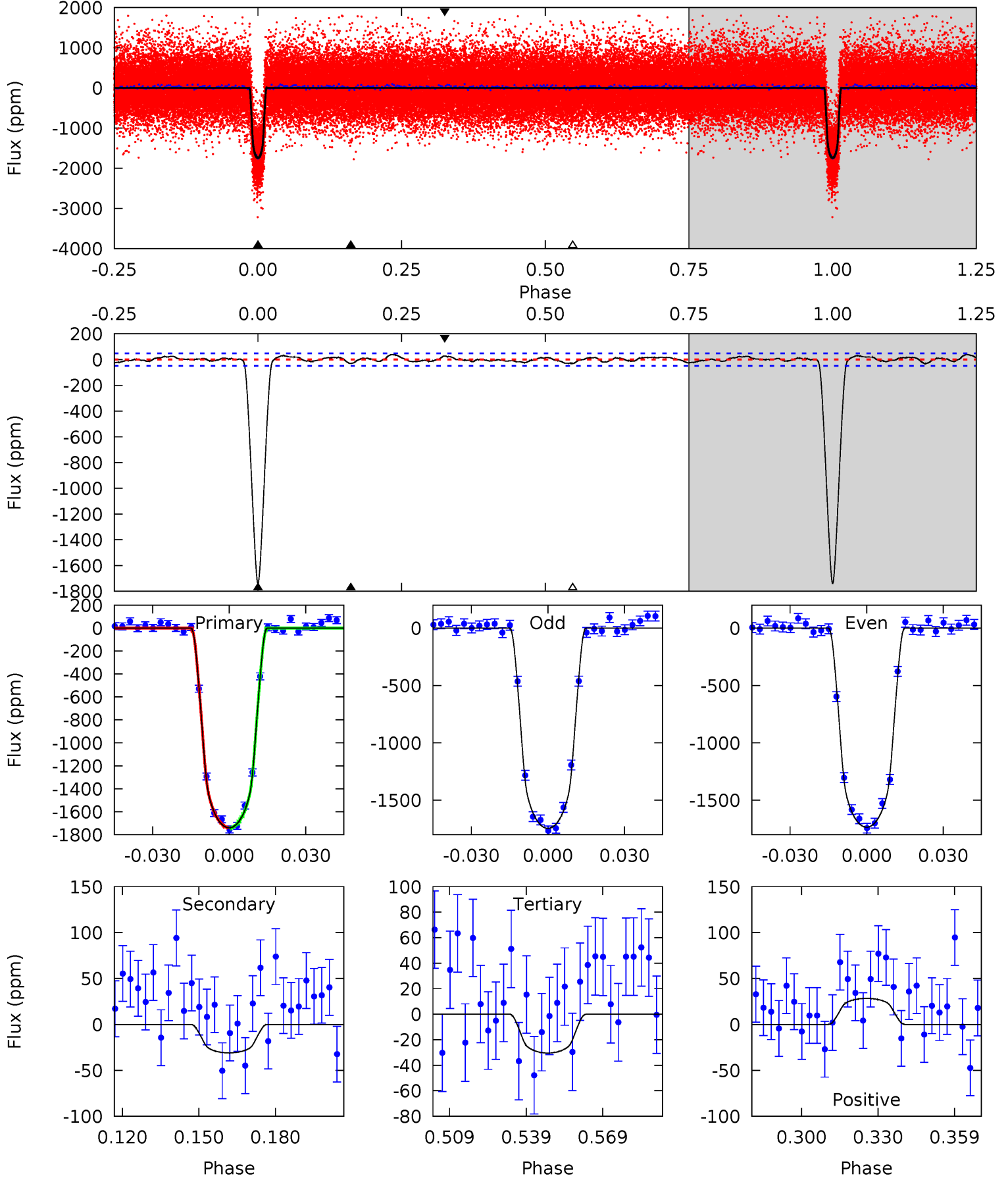
TCE 009946525-02 P= 4.180064 Days  $T_0=131.916123$  (BKJD)



# DV Model-Shift Uniqueness Test

009946525-02, P = 4.180047 Days, E = 127.739001 Days

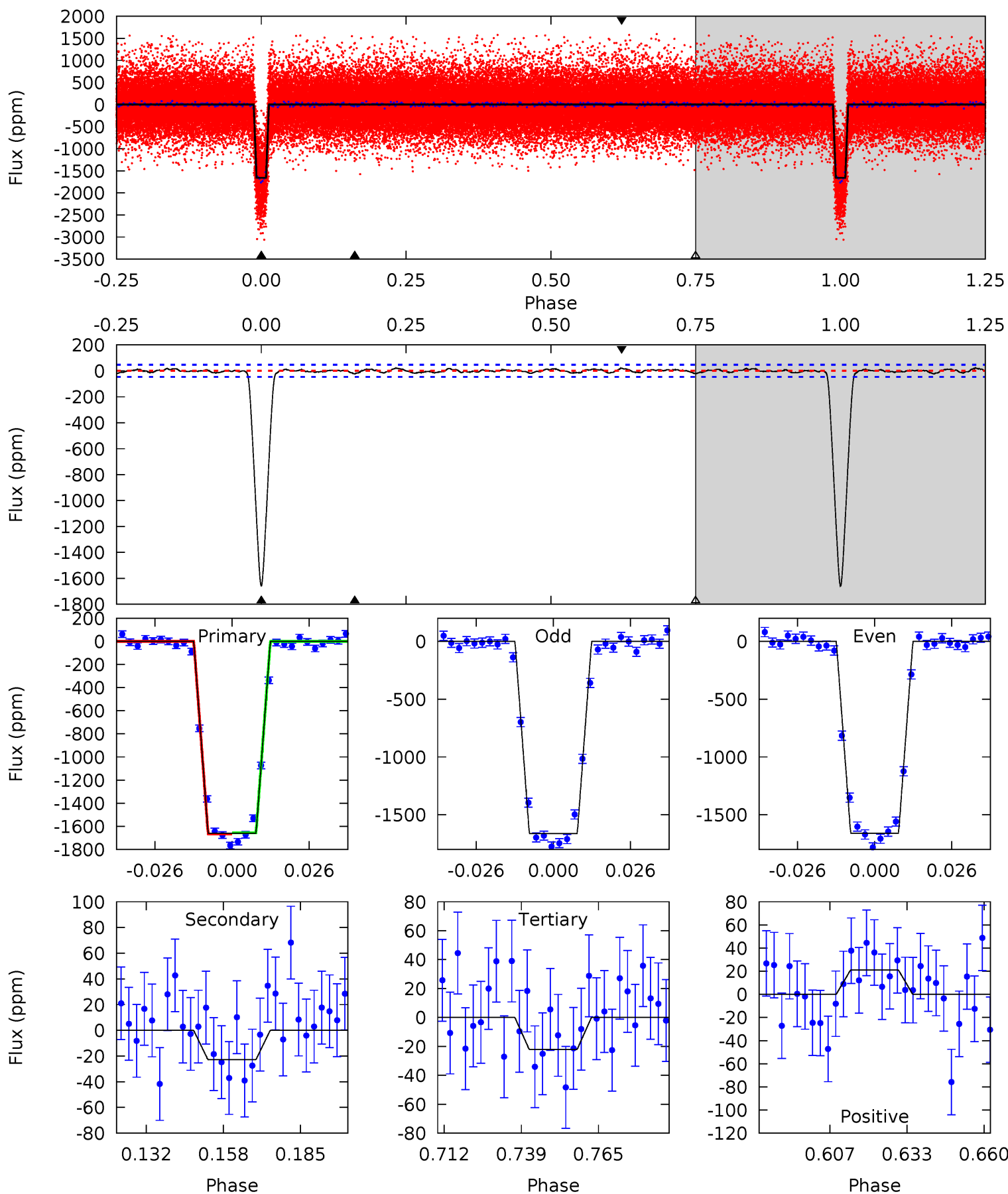
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
172.8	3.08	3.02	2.82	4.81	2.17	1.39	169.7	170.0	0.06	0.26	0.51	0.98	0.02	0.19



# Alt Model-Shift Uniqueness Test

009946525-02, P = 4.180064 Days, E = 127.736059 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
172.6	2.38	2.30	2.18	4.84	2.22	0.93	170.3	170.4	0.08	0.20	0.17	0.99	0.01	0.51





### Stellar Parameters For KIC 009946525

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5227^{+73}_{-83}$	$4.535^{+0.033}_{-0.066}$	$0.140^{+0.150}_{-0.150}$	$0.838^{+0.068}_{-0.040}$	$0.876^{+0.041}_{-0.050}$	$2.100^{+0.269}_{-0.421}$
	+1%/-2%	+1%/-1%	+107%/-107%	+8%/-5%	+5%/-6%	+13%/-20%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009946525-02 / KOI 0398.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-31 \pm 10$	$3.91^{+0.30}_{-0.28}$	$1342^{+34}_{-30}$	$2633^{+113}_{-160}$	$2.629^{+0.997}_{-0.900}$
Alt.	$-23 \pm 10$	$3.77^{+0.29}_{-0.25}$	$1342^{+32}_{-29}$	$2537^{+143}_{-191}$	$2.069^{+0.907}_{-0.863}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

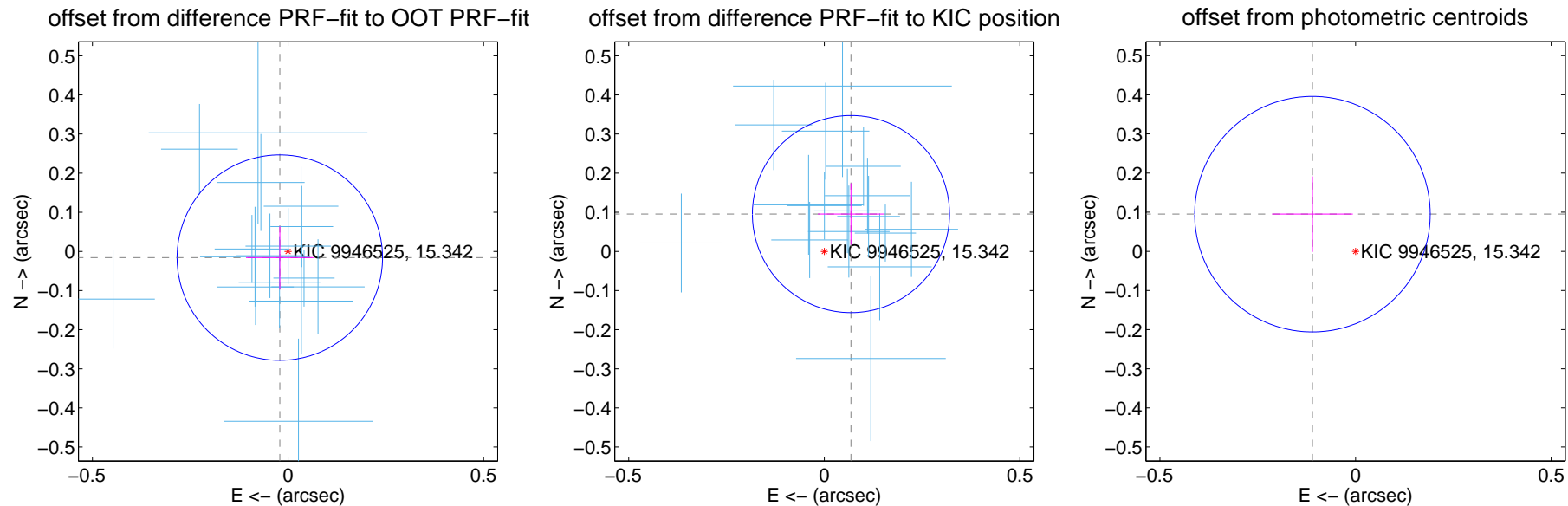
## DV Centroid Data

Supplemental centroid analysis for 009946525-02. Kepler magnitude: 15.34. Transit SNR 109.54

There are 17 quarters with good PRF difference image offsets

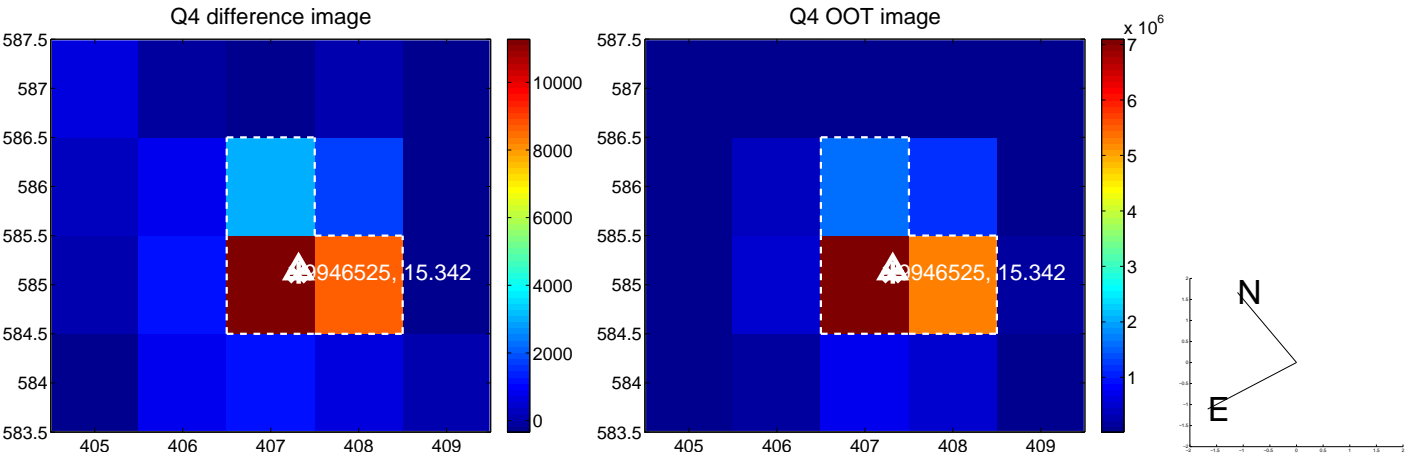
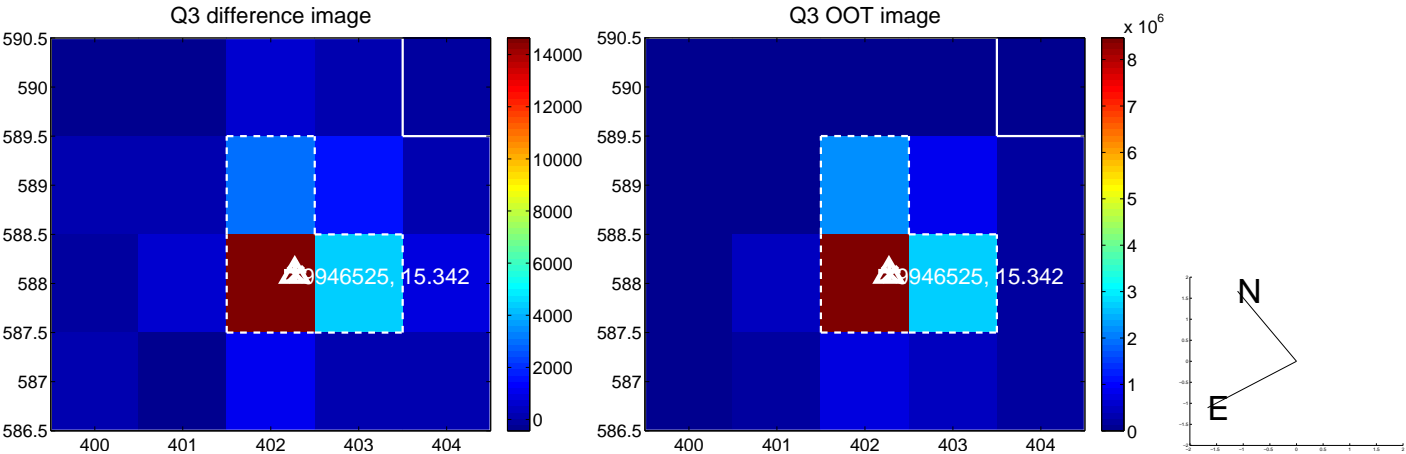
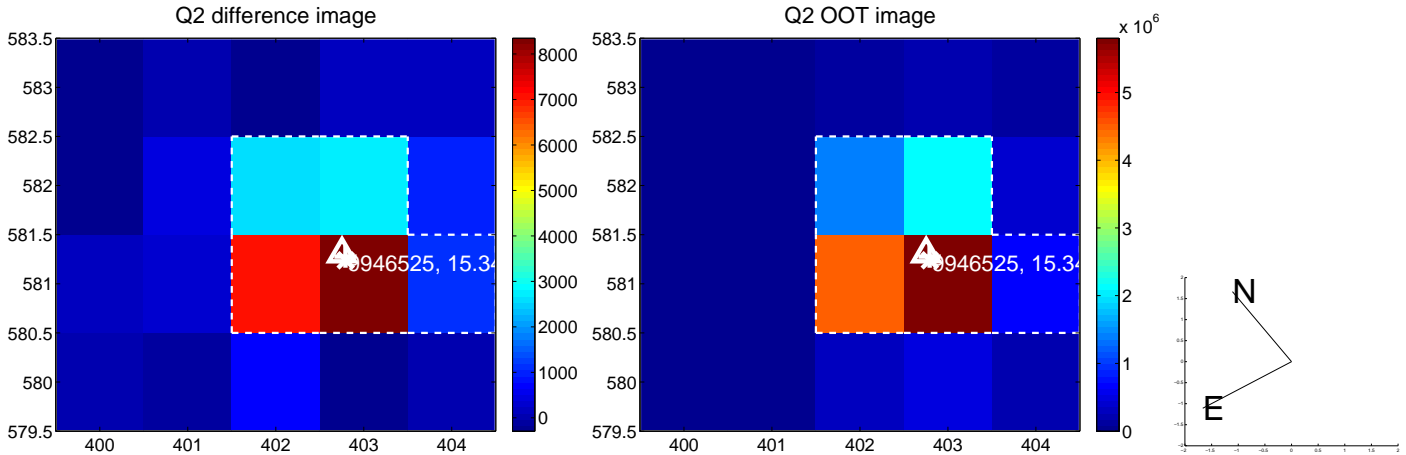
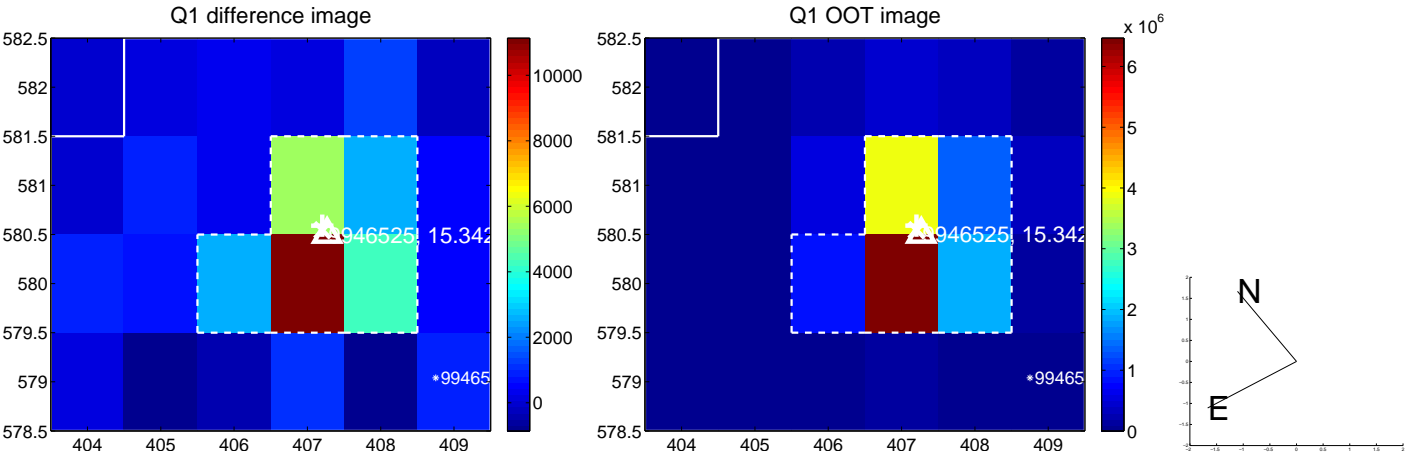
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.026 \pm 0.088$	0.30	$0.021 \pm 0.086$	$-0.016 \pm 0.080$
PRF-fit source offset from KIC position	$0.117 \pm 0.084$	1.40	$-0.068 \pm 0.084$	$0.095 \pm 0.079$
photometric centroid source offset	$0.15 \pm 0.10$	1.45	$0.11 \pm 0.10$	$0.10 \pm 0.10$

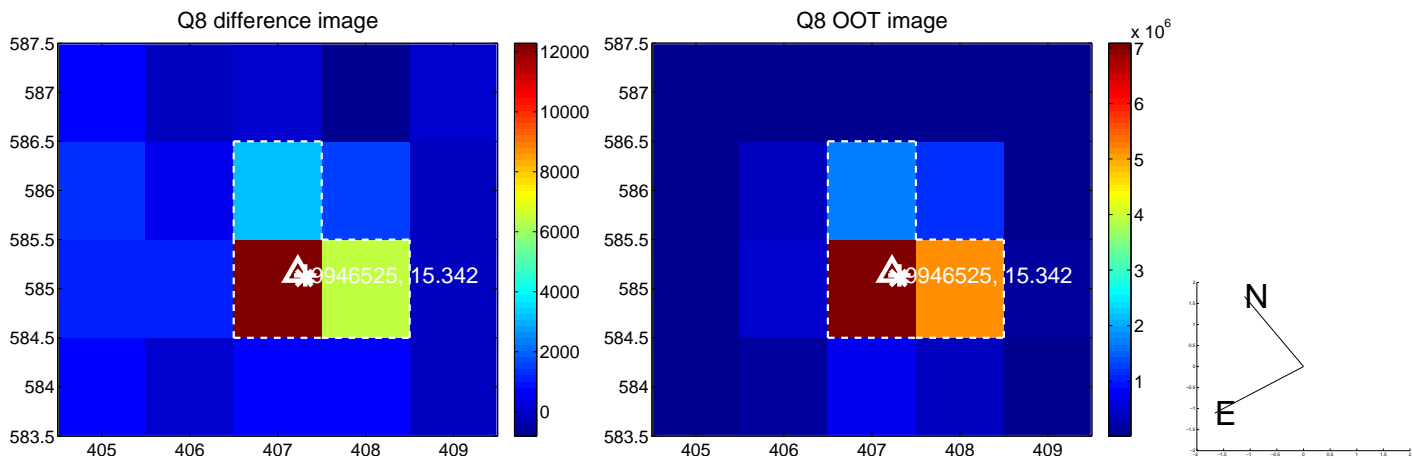
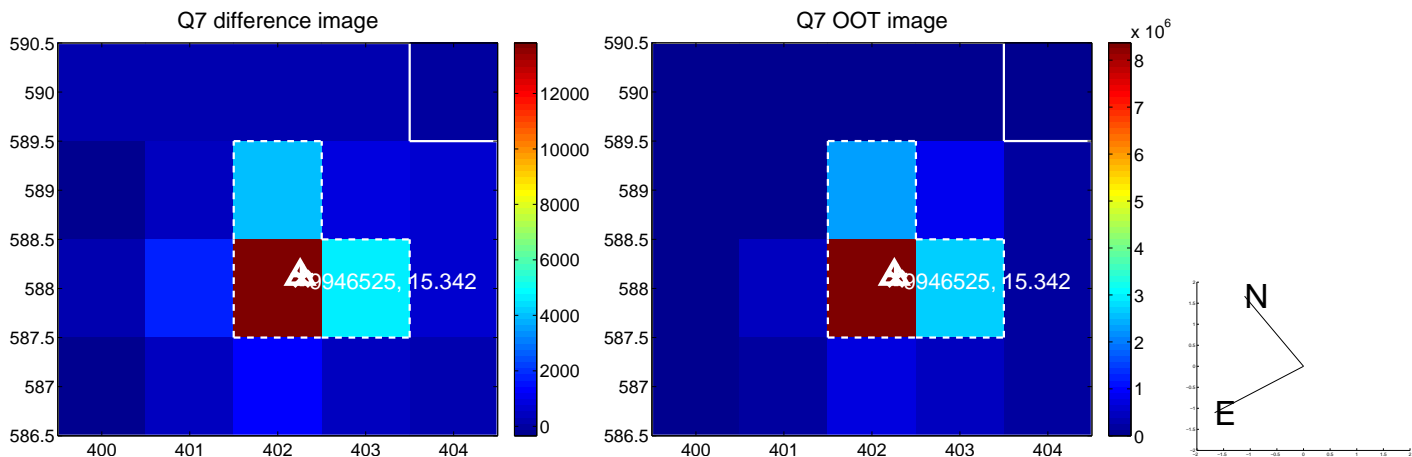
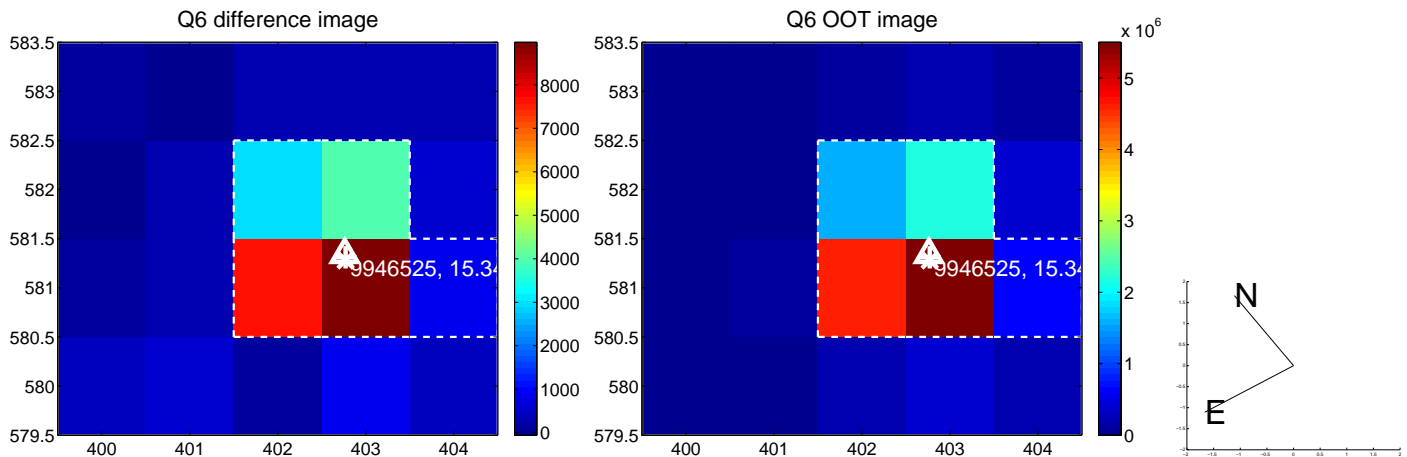
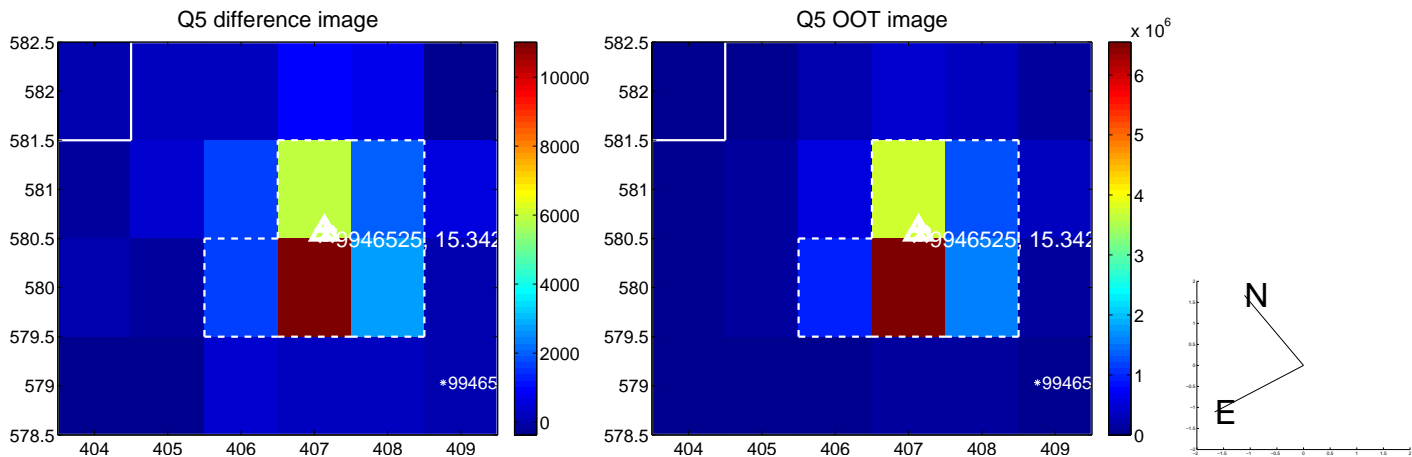


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

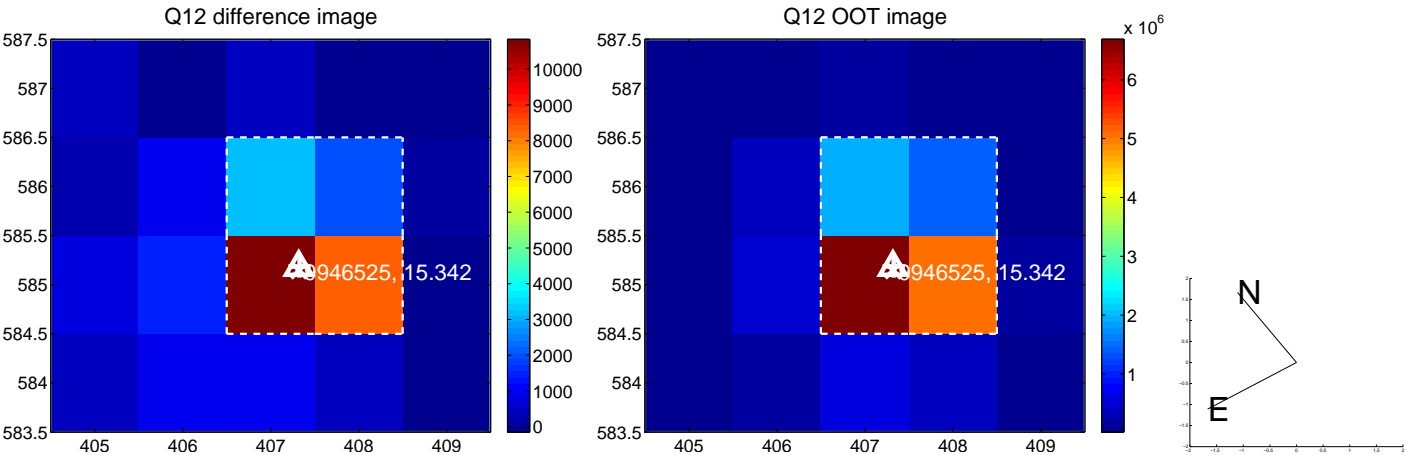
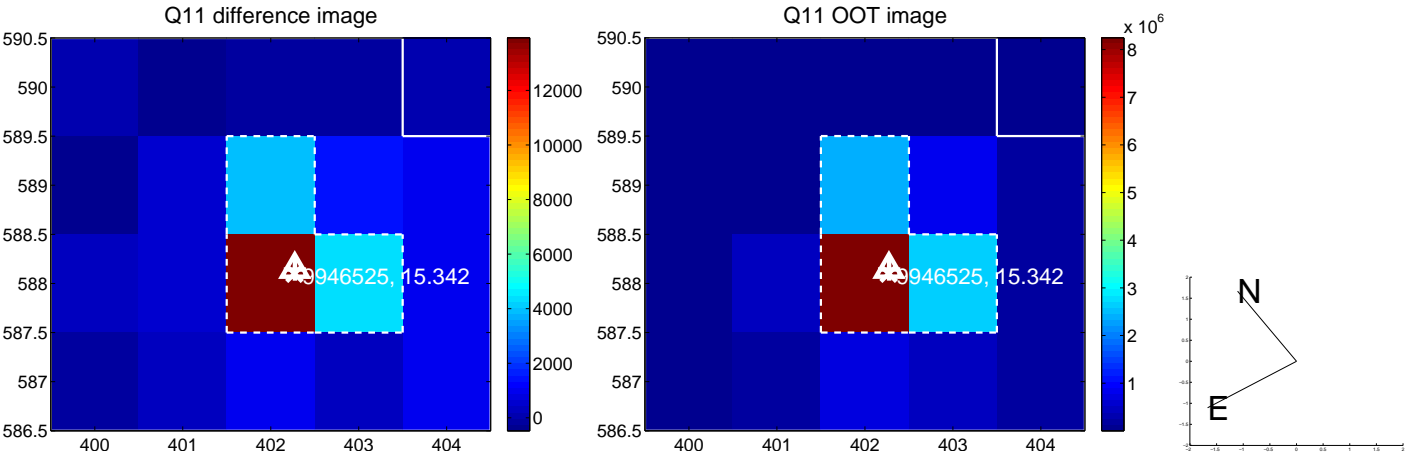
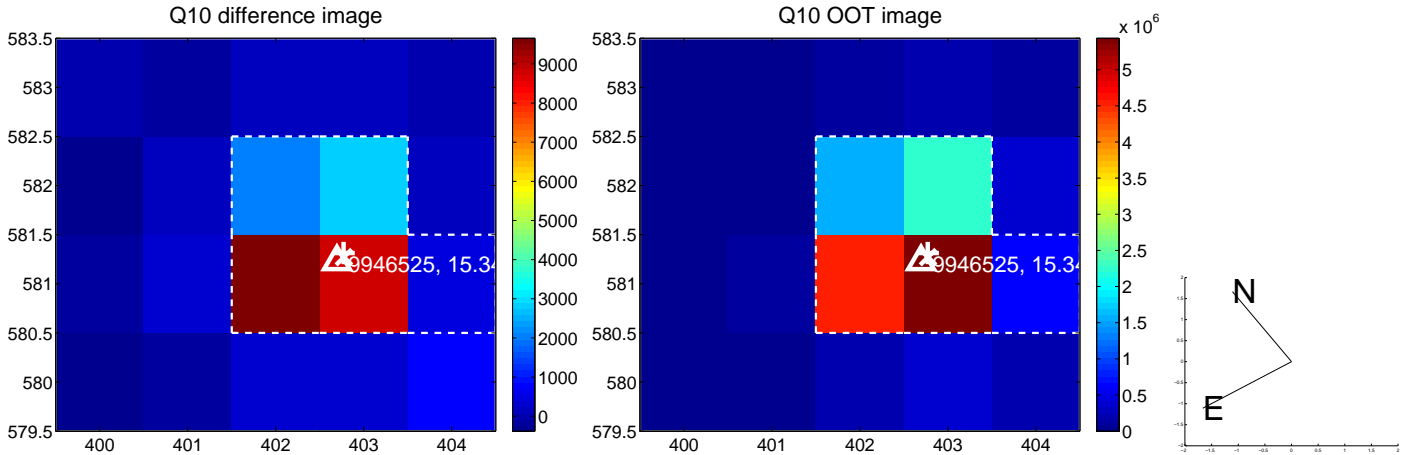
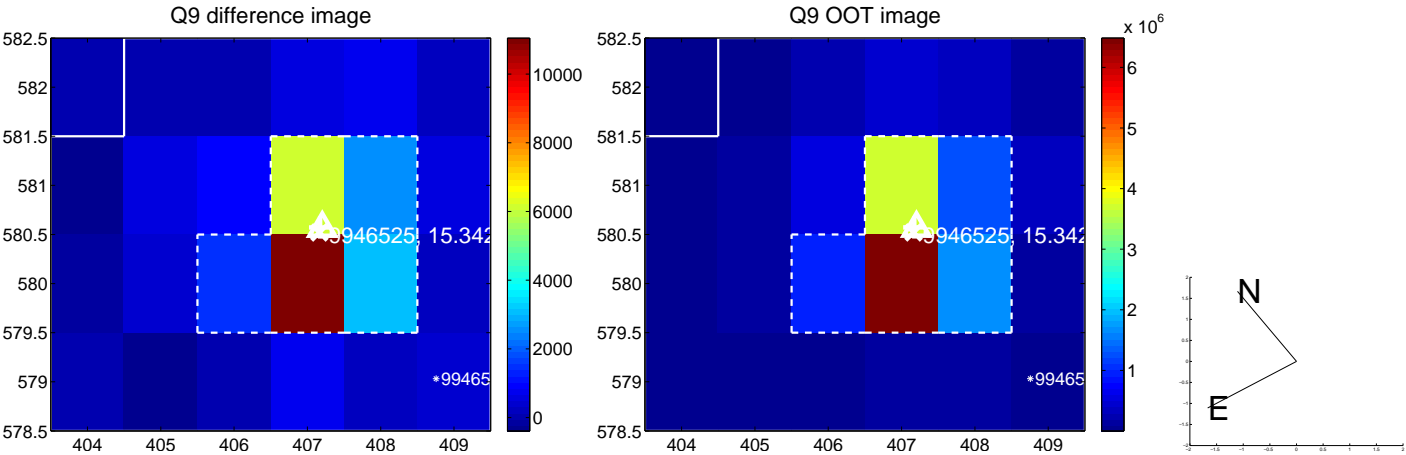
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



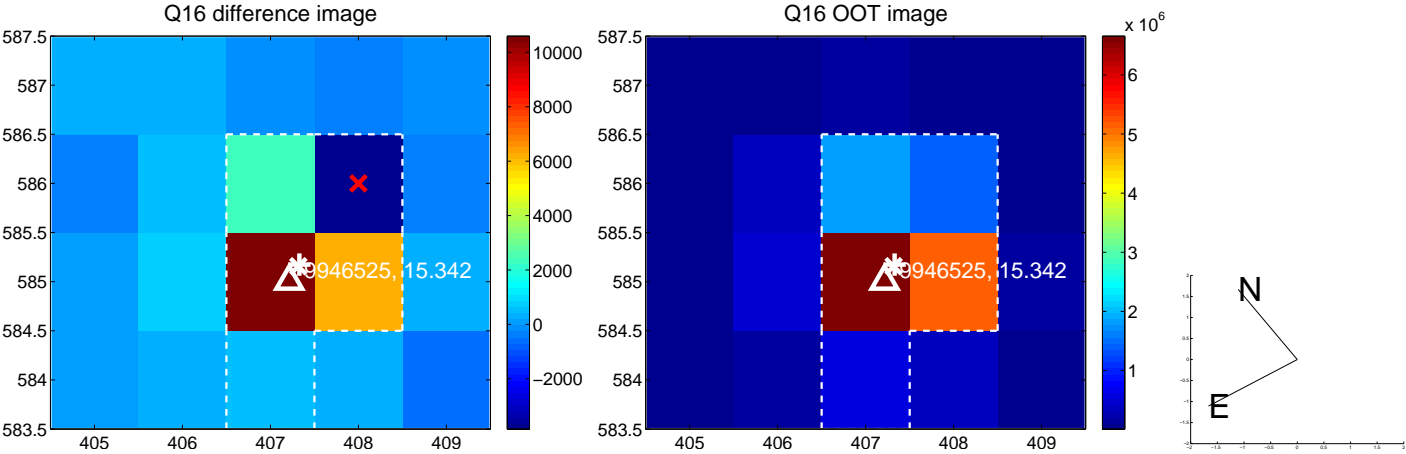
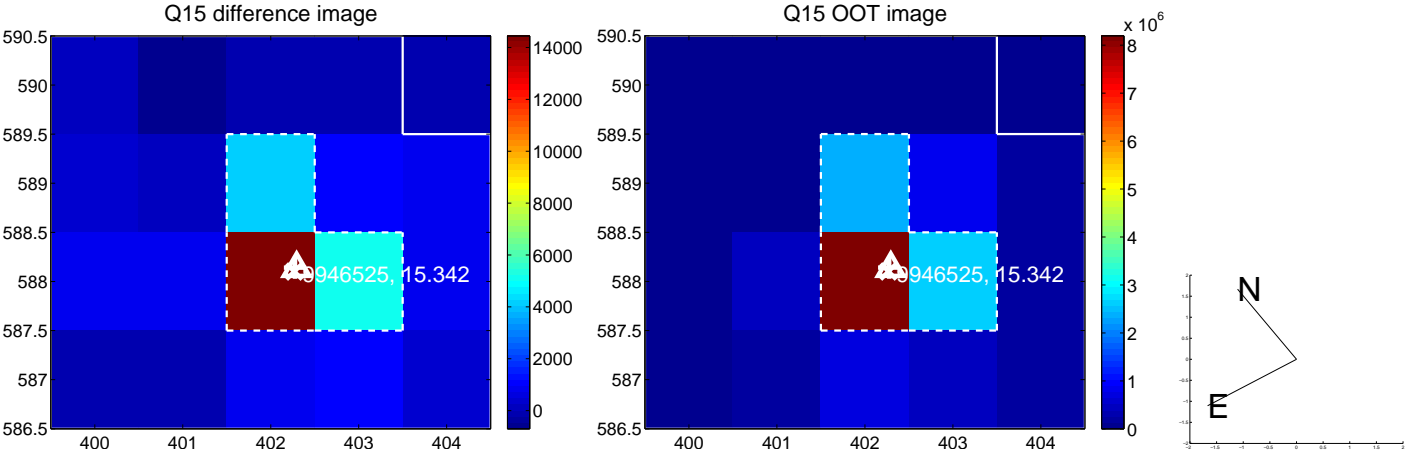
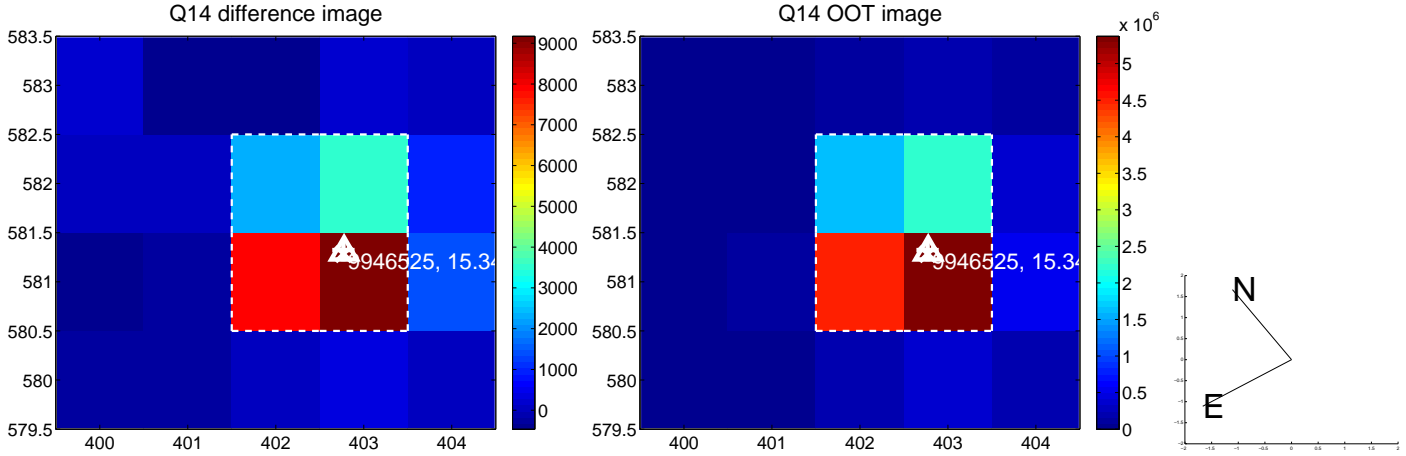
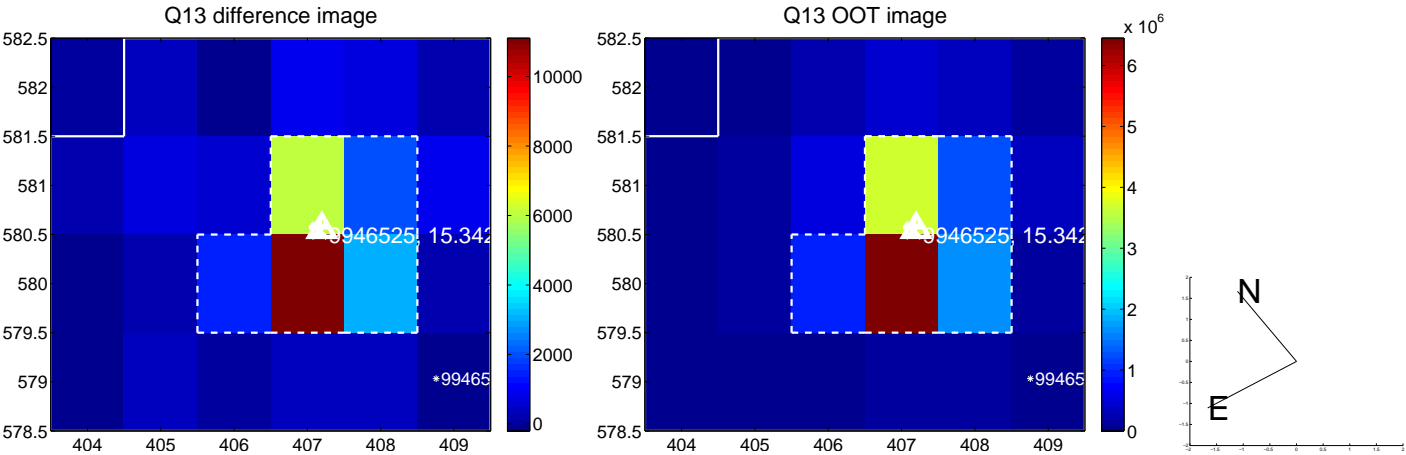
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



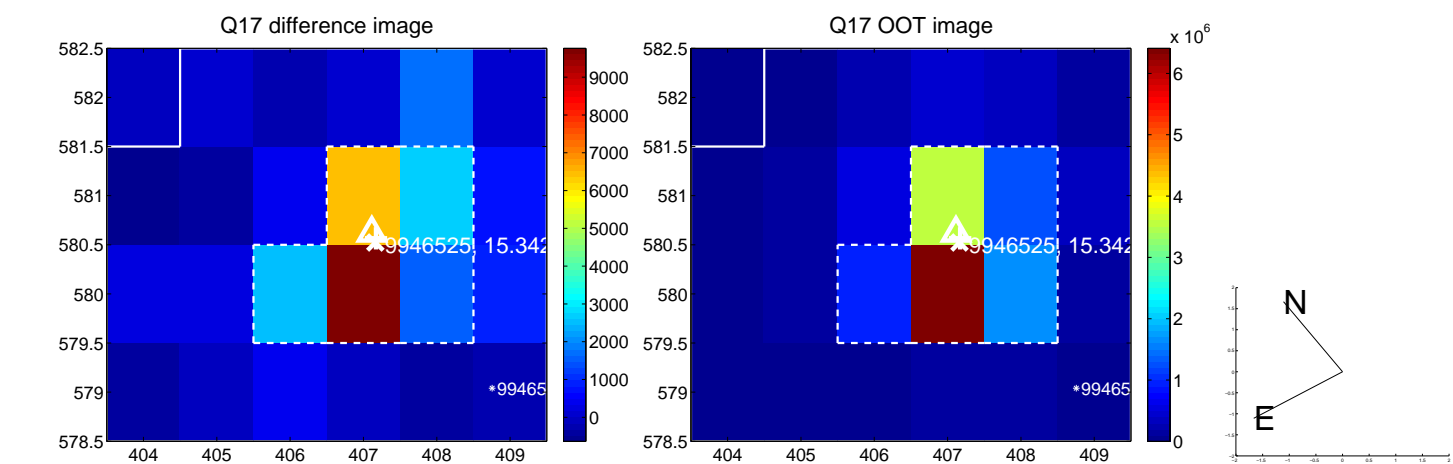
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



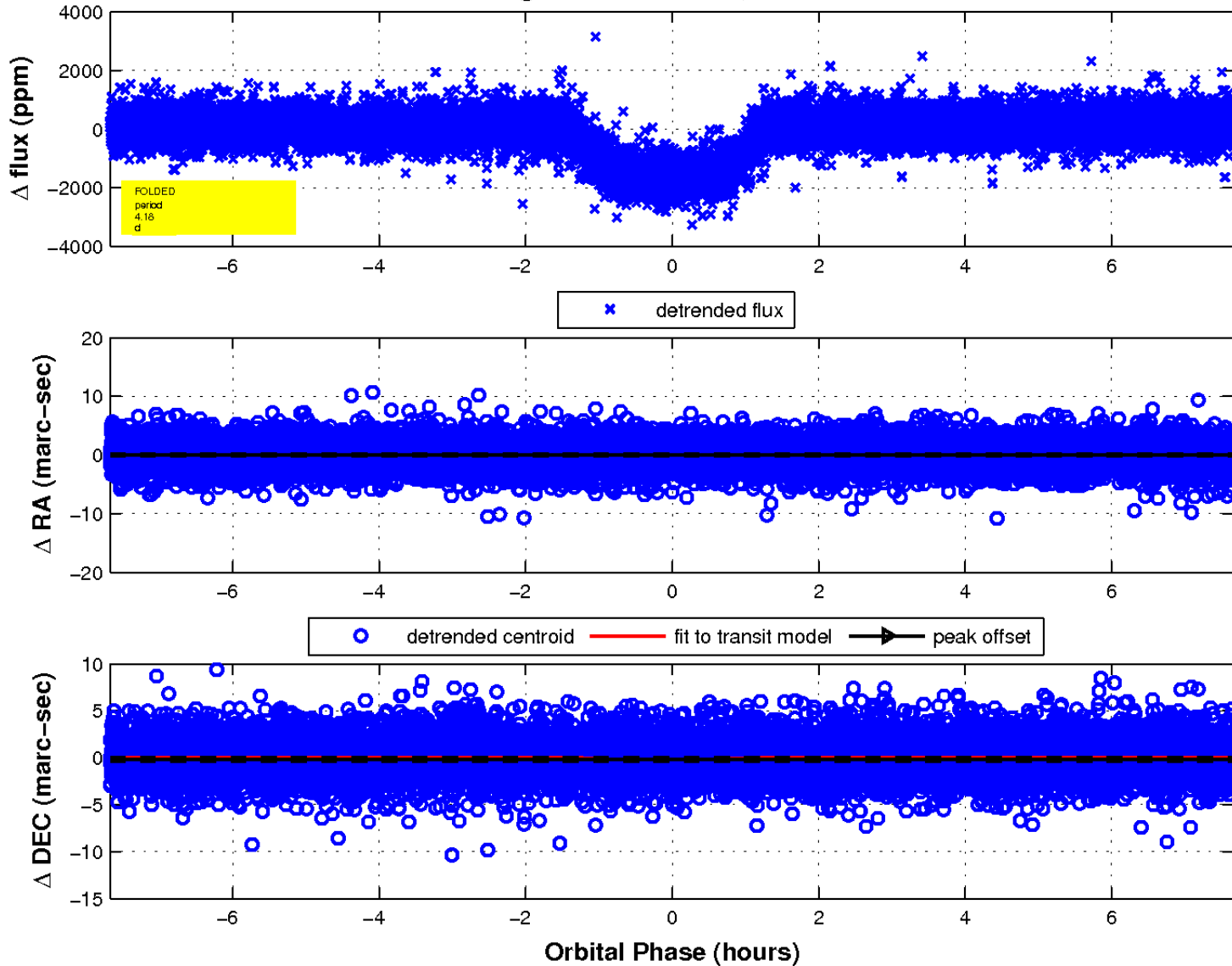
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

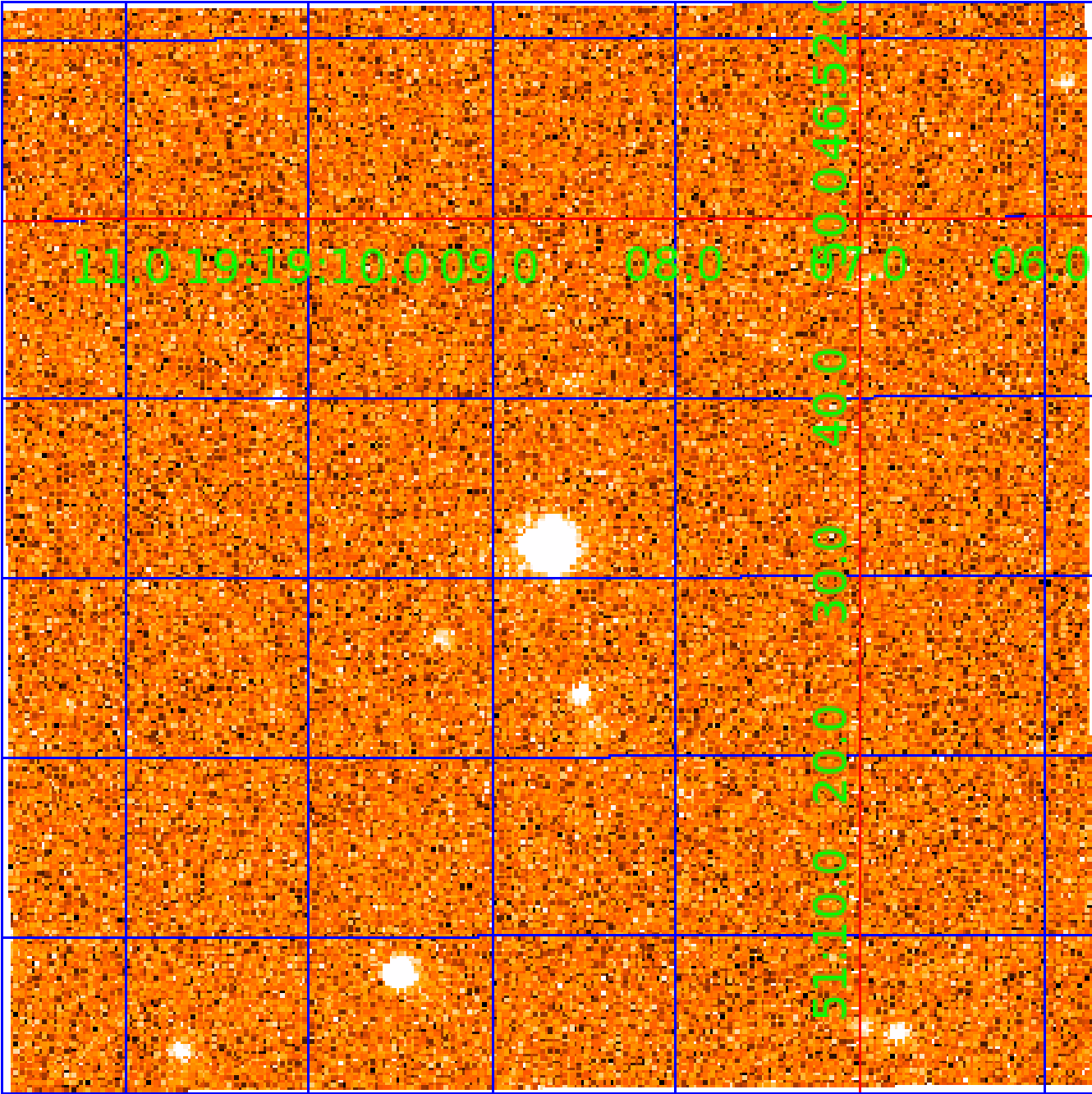


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination





# KIC 009946525

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009946525-01	OBS	0398.01	51.846917	170.080573	9676.3	4.832	188.1	189.4	0.84	5227	8.85	6.92
009946525-02	OBS	0398.02	4.180047	131.919048	1764.6	2.559	102.8	109.5	0.84	5227	3.88	198.53
009946525-03	OBS	0398.03	1.729356	132.093511	458.6	1.852	36.4	40.8	0.84	5227	2.18	644.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009946525-01	OBS	PC	0.96	0	0	0	0	NO_COMMENT
009946525-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009946525-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

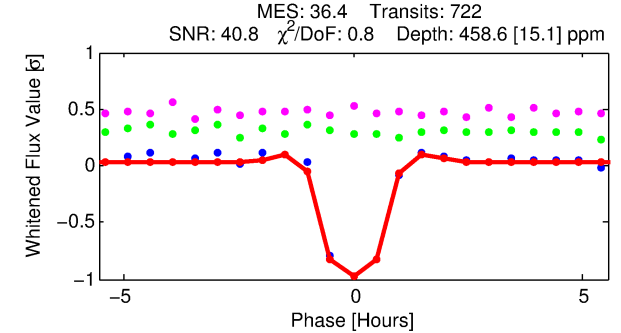
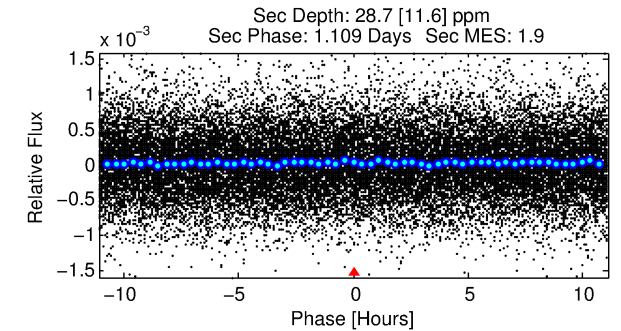
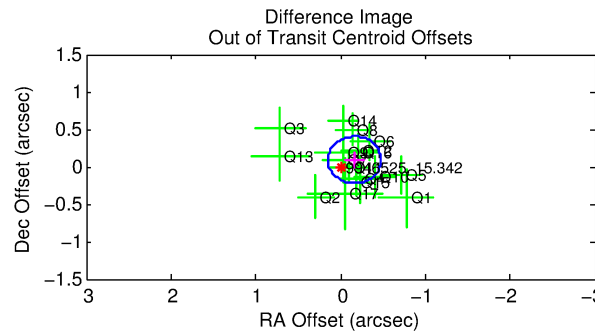
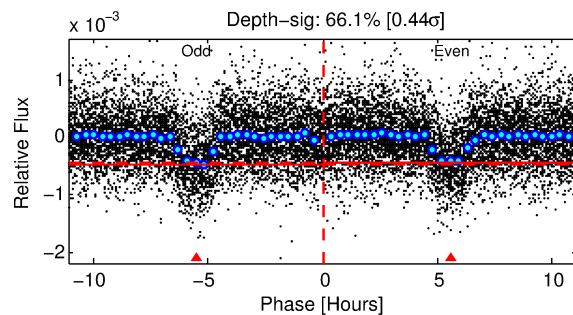
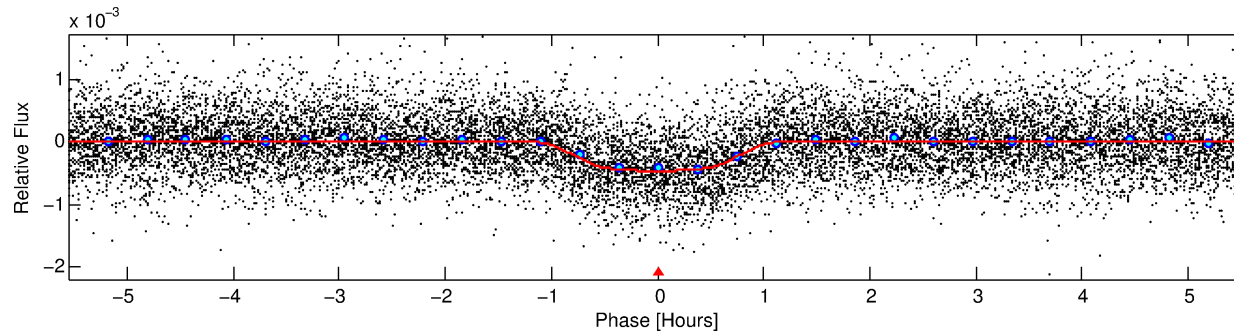
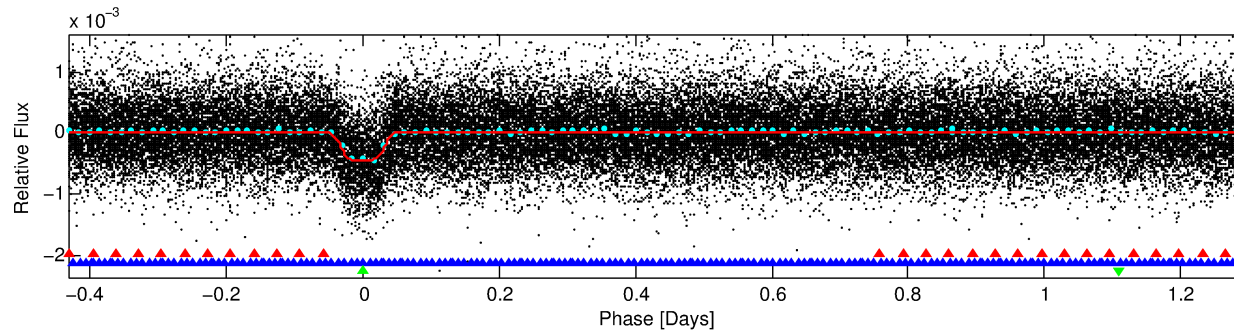
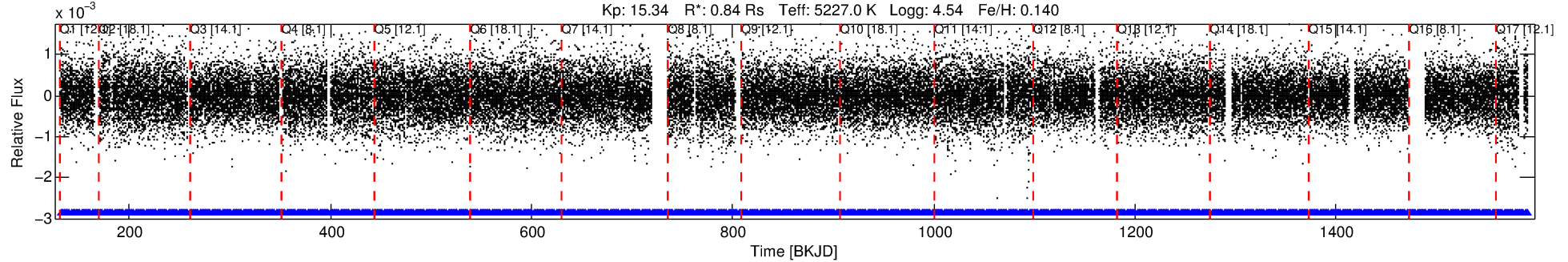
Ephemeris Match Information For 009946525-03

No Significant Match Found

# DV One-Page Summary

KIC: 9946525 Candidate: 3 of 3 Period: 1.729 d  
KOI: K00398.03 Name: Kepler-148b Corr: 0.964

Kp: 15.34 R\*: 0.84 Rs Teff: 5227.0 K Logg: 4.54 Fe/H: 0.140



## DV Fit Results:

Period = 1.72936 [0.00000] d  
Epoch = 132.0935 [0.0006] BKJD  
Rp/R\* = 0.0238 [0.0035]  
a/R\* = 3.63 [1.96]  
b = 0.90 [0.13]  
Seff = 644.00 [84.52]  
Teff = 1285 [42] K  
Rp = 2.18 [0.36] Re  
a = 0.0270 [0.0020] AU  
Ag = 2.44 [1.25] [1.15σ]  
Teffp = 2481 [312] K [3.80σ]

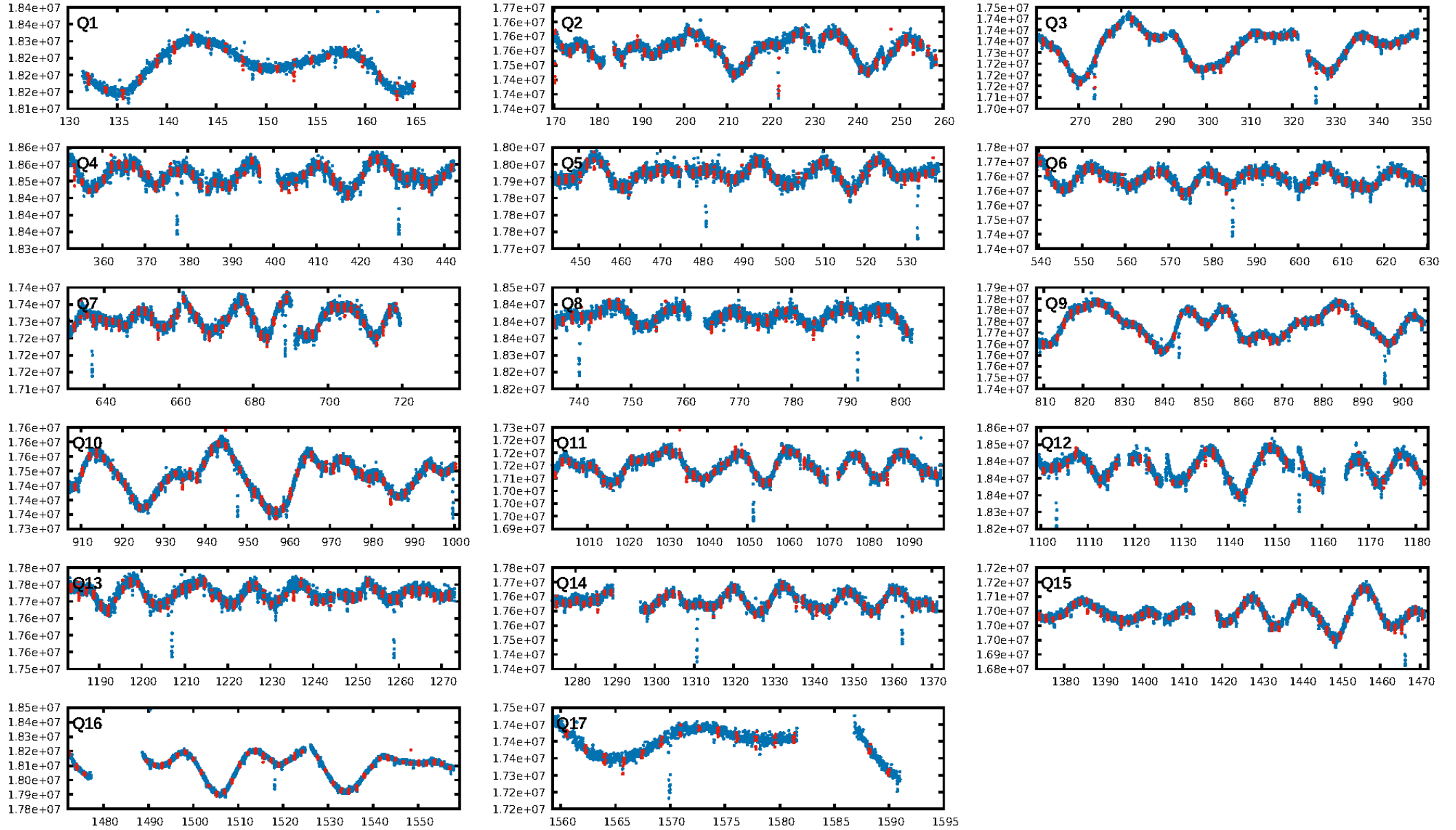
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [18.62σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 9.58e-271  
RollingBand-fgt: 1.00 [689/689]  
GhostDiagnostic-chr: -90.7  
Centroid-sig: 17.0%  
Centroid-so: 0.364 arcsec [1.25σ]  
OotOffset-rm: 0.185 arcsec [1.77σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.330 arcsec [3.22σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

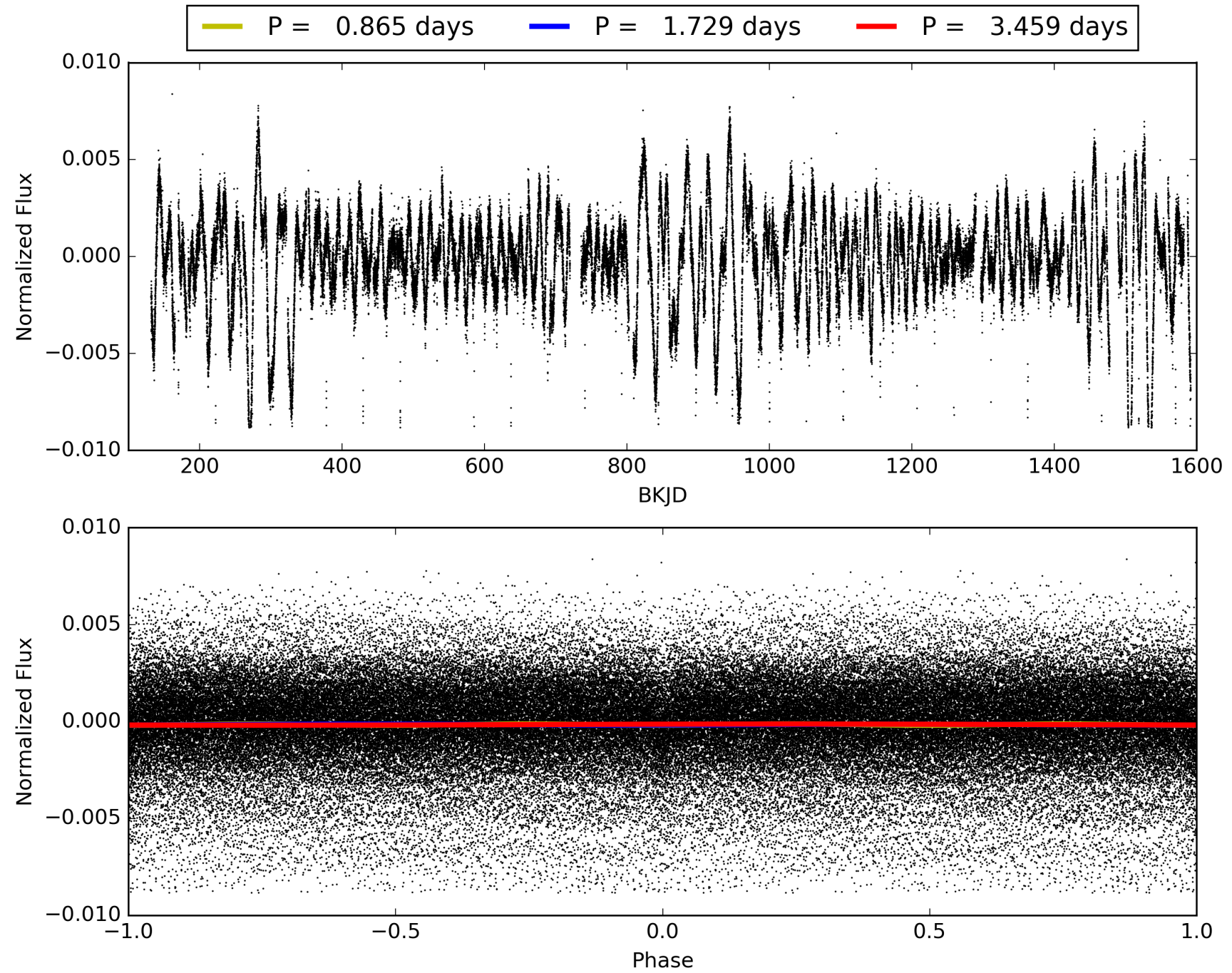
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:05:27 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009946525-03, PDC Light Curves

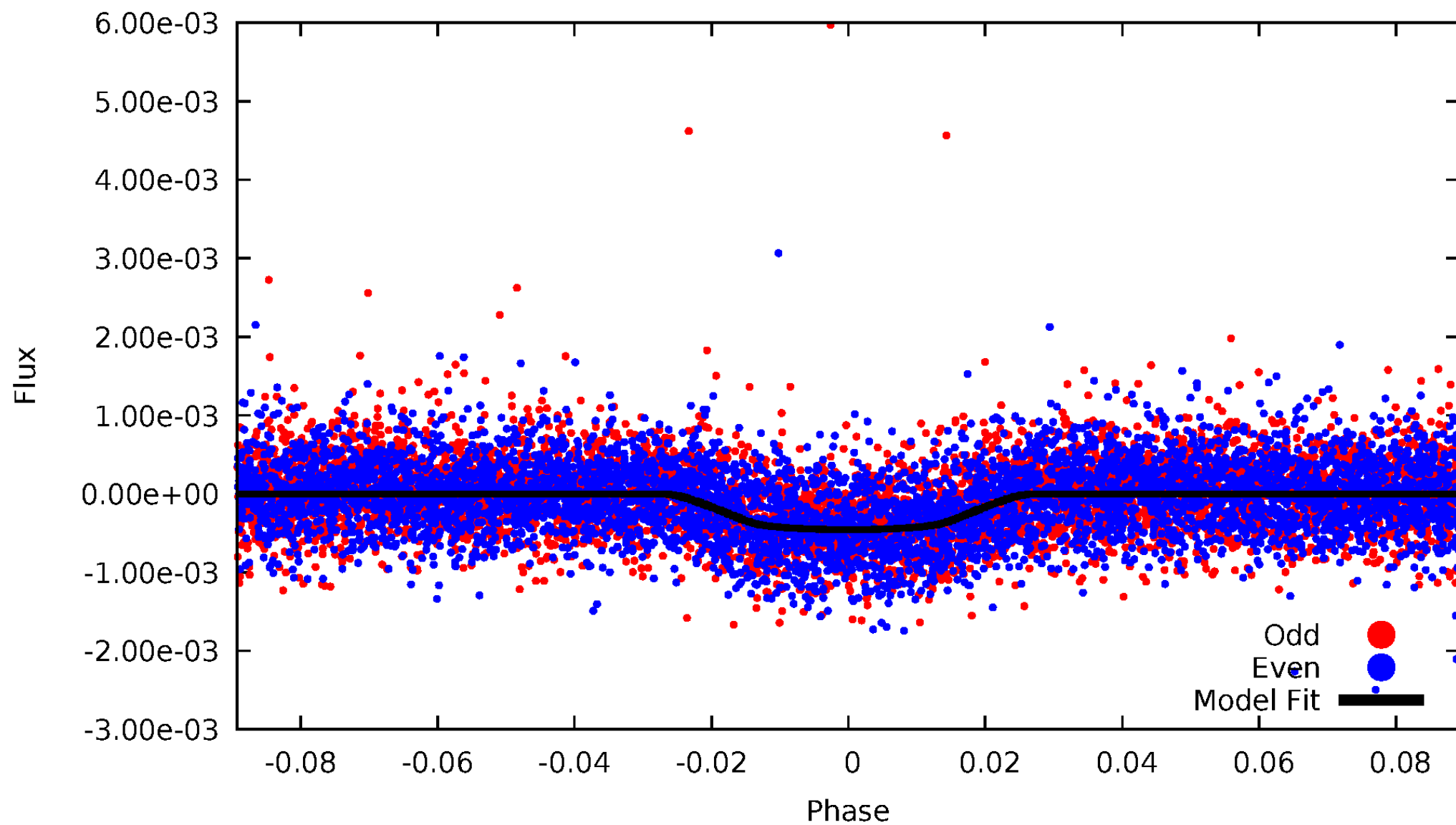


TCE 009946525-03



# DV Odd/Even

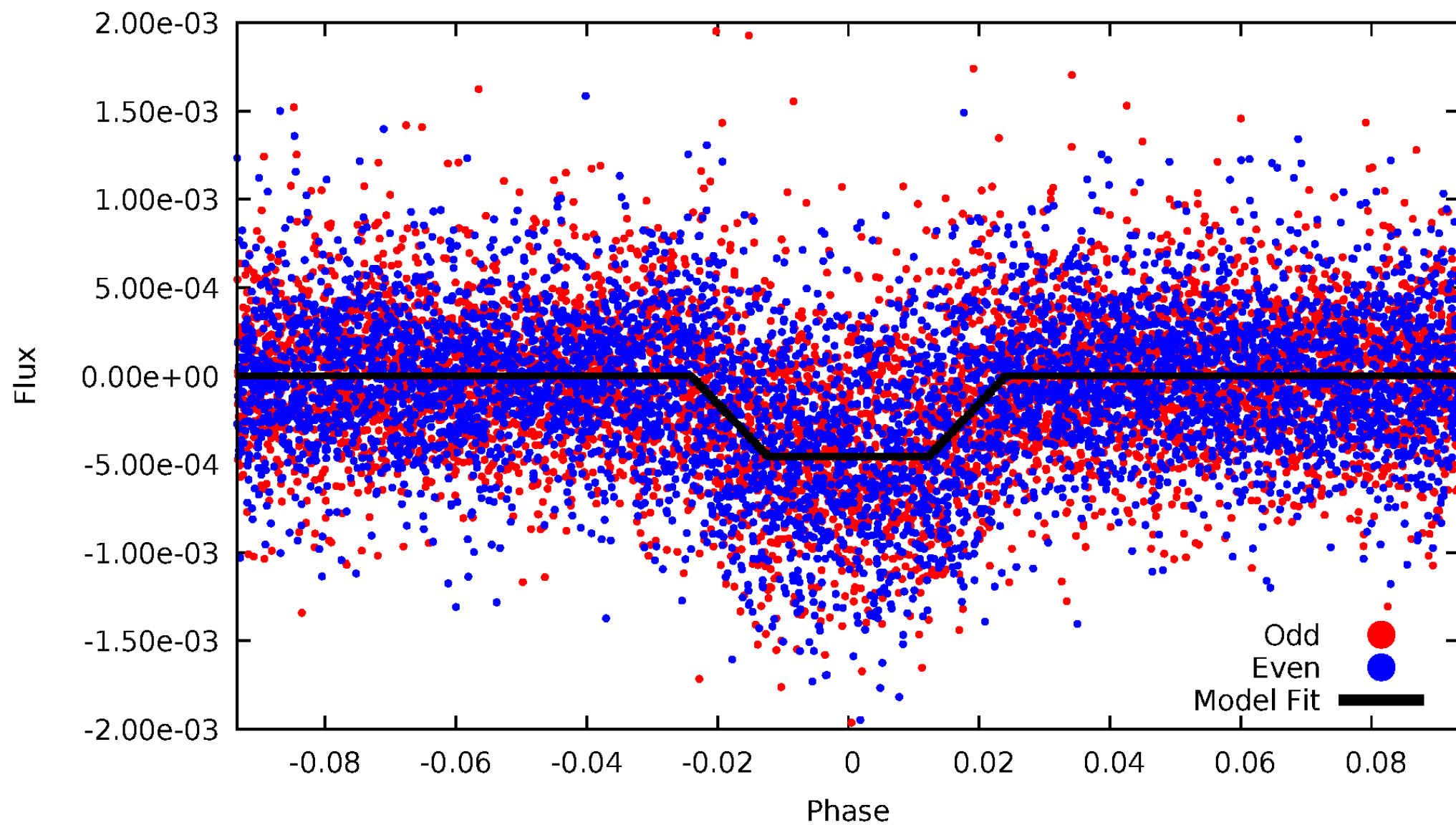
TCE 009946525-03



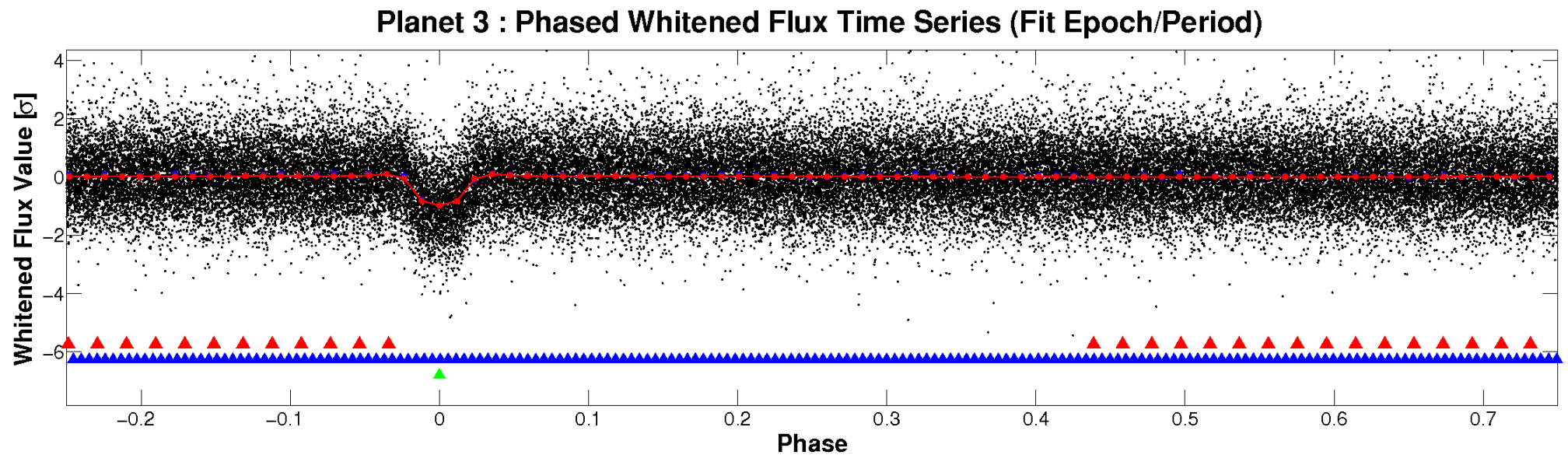
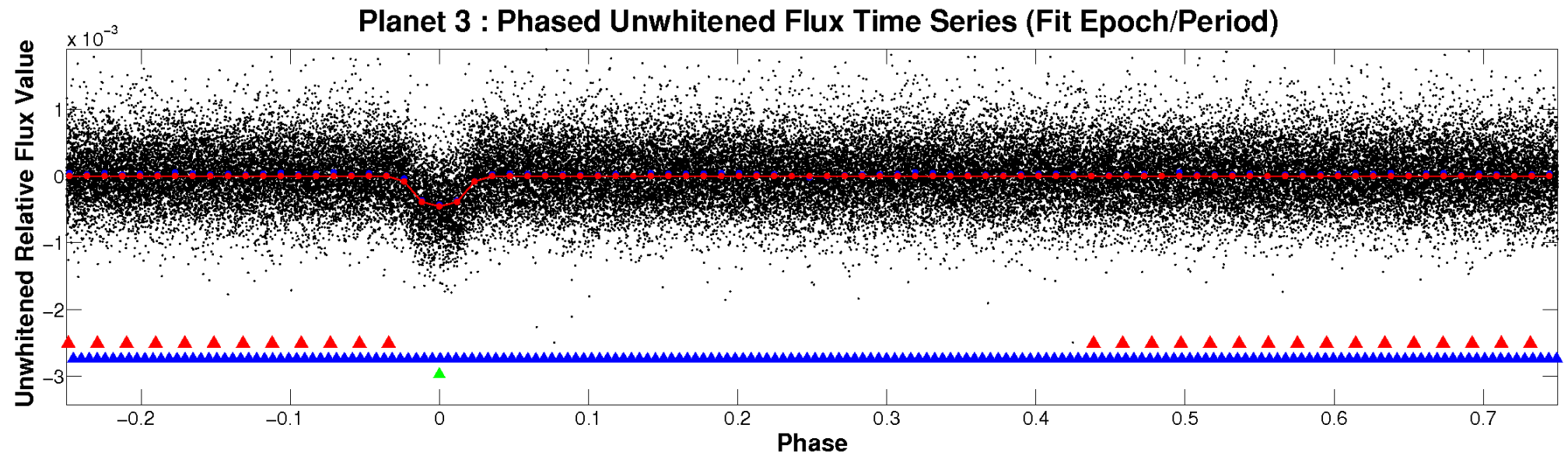


# ALT Odd/Even

TCE 009946525-03

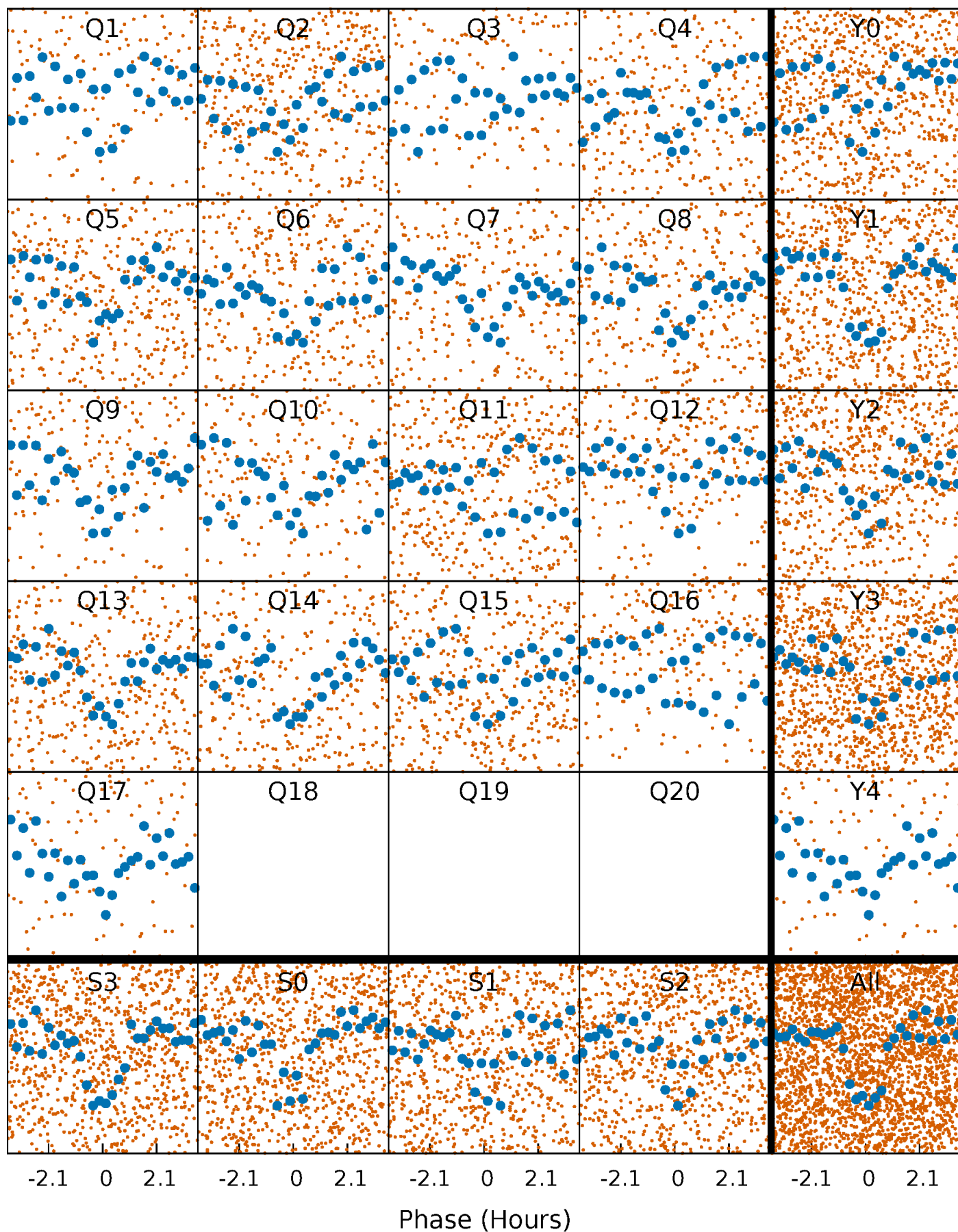


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

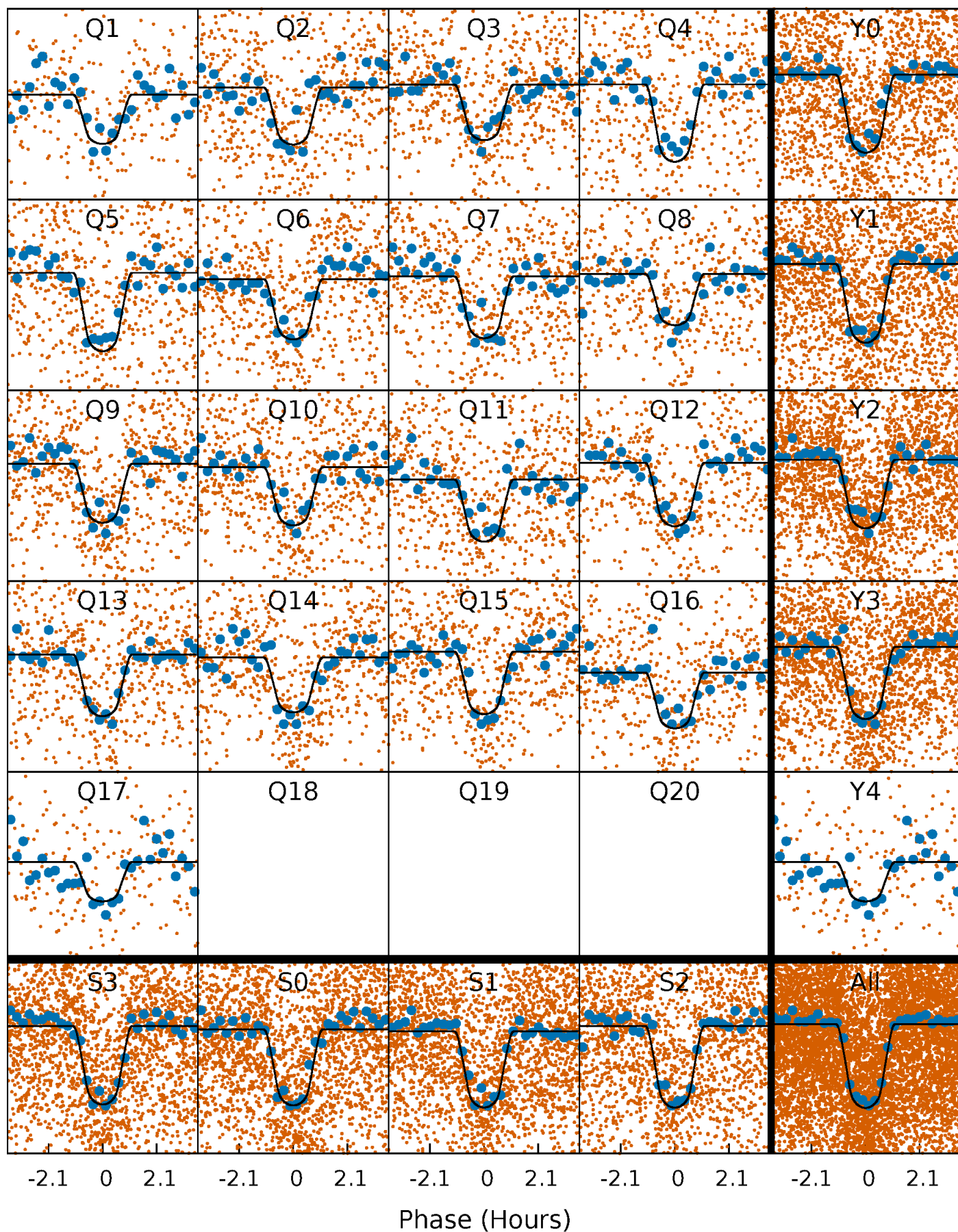
TCE 009946525-03 P= 1.729356 Days  $T_0=132.093511$  (BKJD)





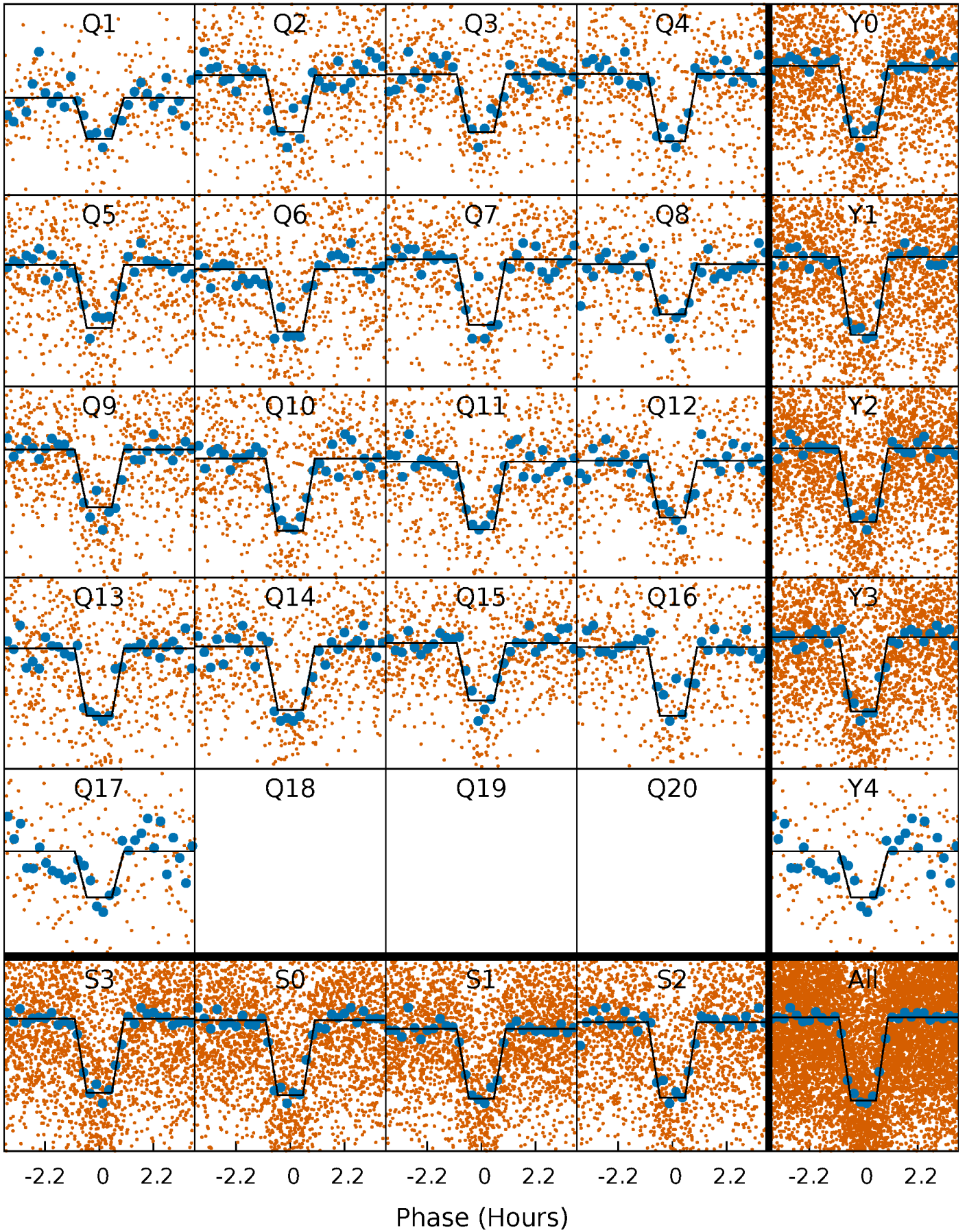
# DV Quarter-Phased Transit Curves

TCE 009946525-03 P= 1.729356 Days  $T_0=132.093511$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

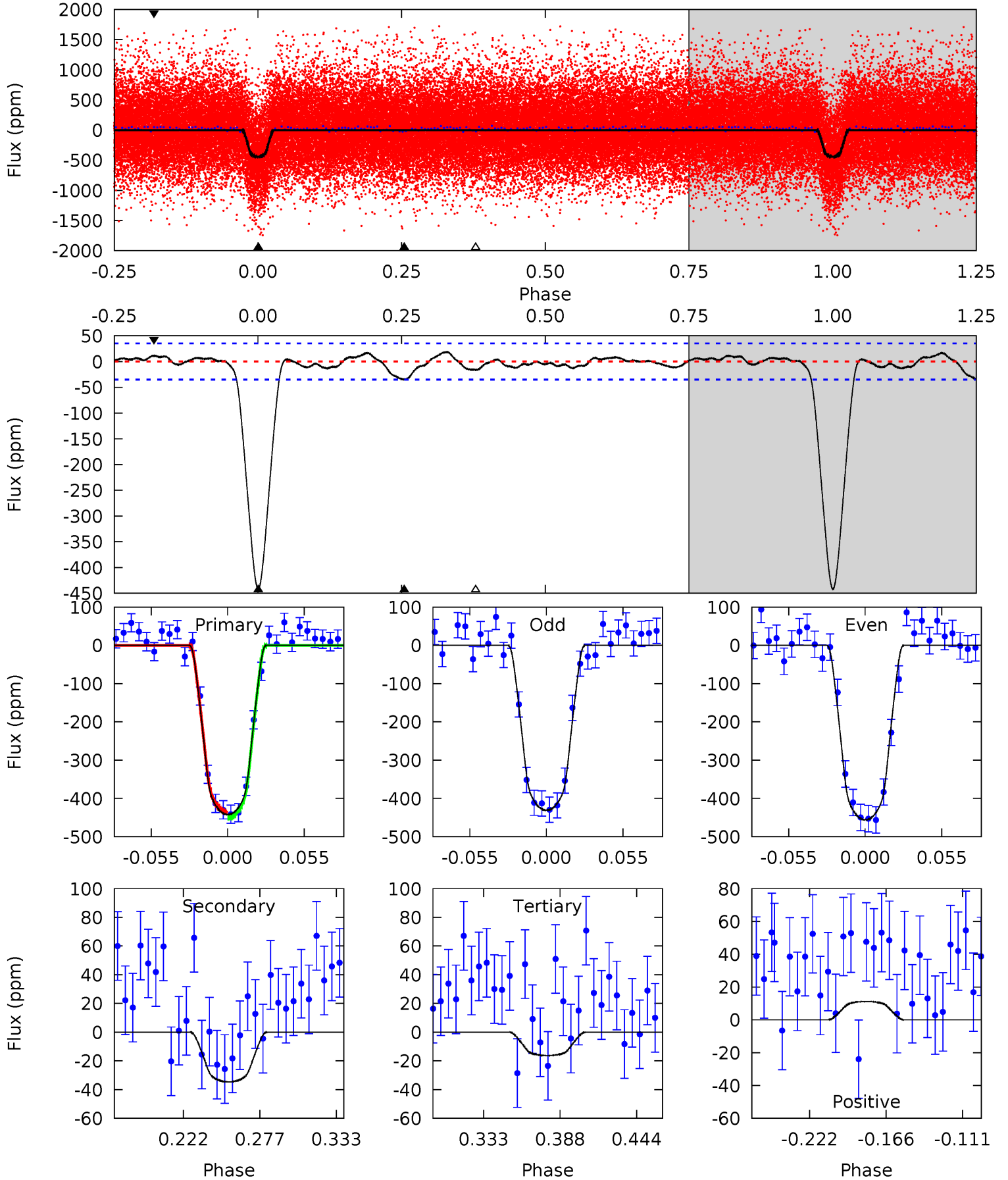
TCE 009946525-03 P= 1.729362 Days  $T_0=132.092039$  (BKJD)



# DV Model-Shift Uniqueness Test

009946525-03, P = 1.729356 Days, E = 130.364155 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
59.2	4.64	2.19	1.50	4.69	1.92	1.06	57.0	57.7	2.45	3.14	1.67	1.00	0.04	0.98

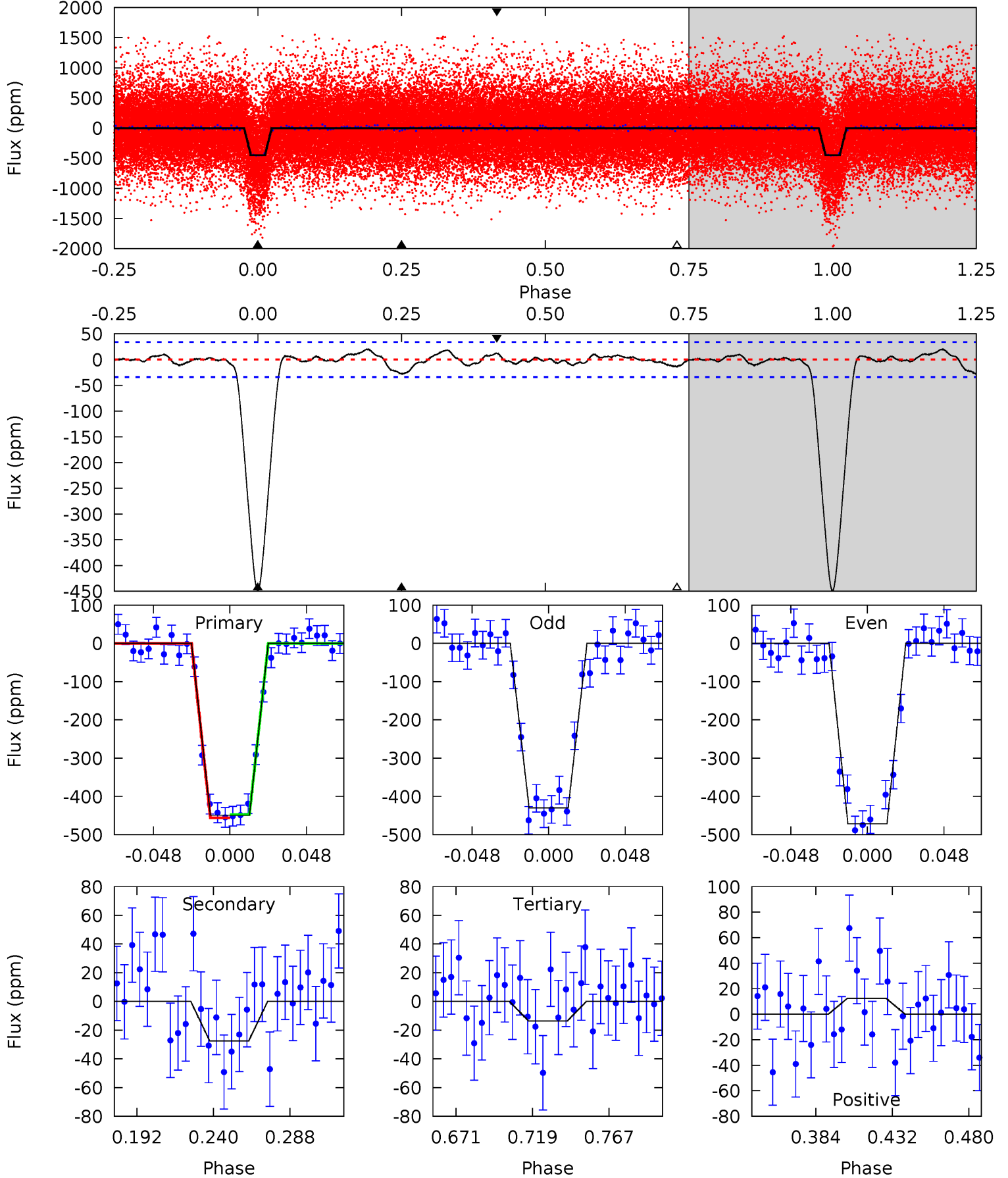




# Alt Model-Shift Uniqueness Test

009946525-03, P = 1.729362 Days, E = 130.362677 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
62.4	3.82	1.88	1.71	4.72	1.98	0.97	60.6	60.7	1.94	2.11	2.87	0.98	0.04	0.60



### Stellar Parameters For KIC 009946525

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5227^{+73}_{-83}$	$4.535^{+0.033}_{-0.066}$	$0.140^{+0.150}_{-0.150}$	$0.838^{+0.068}_{-0.040}$	$0.876^{+0.041}_{-0.050}$	$2.100^{+0.269}_{-0.421}$
	+1%/-2%	+1%/-1%	+107%/-107%	+8%/-5%	+5%/-6%	+13%/-20%
Source	SPE90	SPE90	SPE90	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009946525-03 / KOI 0398.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-35 \pm 7$	$2.20^{+0.36}_{-0.33}$	$1801^{+45}_{-39}$	$3113^{+200}_{-182}$	$2.820^{+1.393}_{-0.876}$
Alt.	$-27 \pm 7$	$1.98^{+0.34}_{-0.33}$	$1802^{+44}_{-37}$	$3107^{+226}_{-208}$	$2.752^{+1.503}_{-0.935}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming A=0.3)

$A_{obs}$  = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

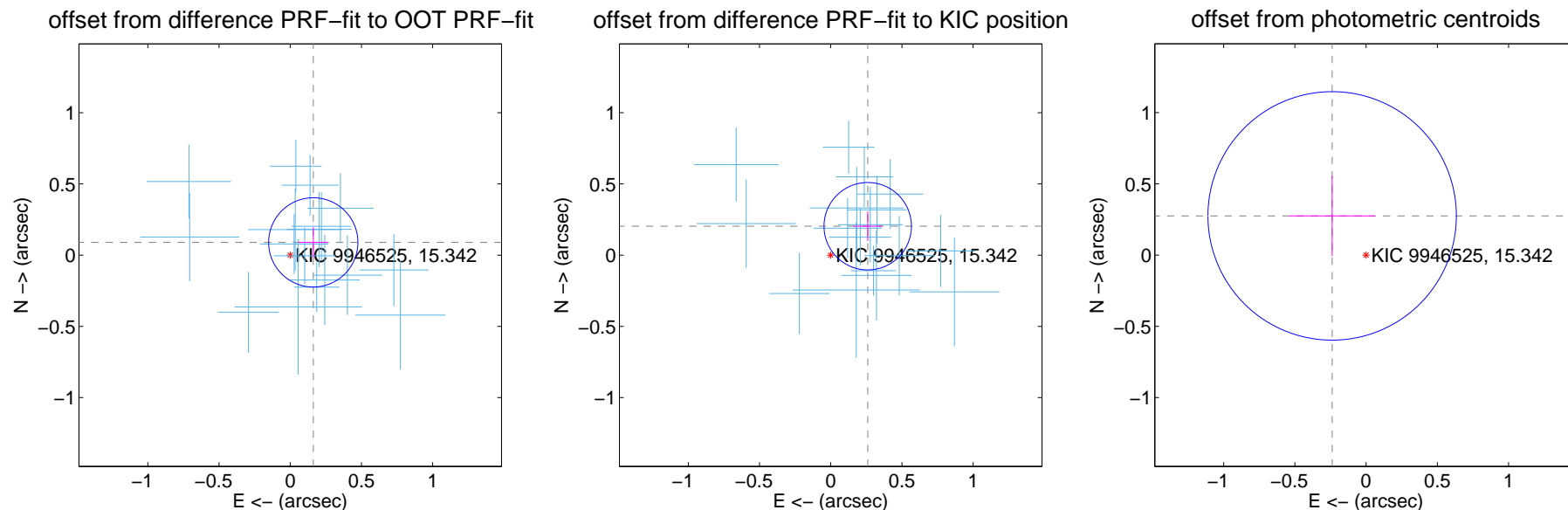
## DV Centroid Data

Supplemental centroid analysis for 009946525-03. Kepler magnitude: 15.34. Transit SNR 40.84

There are 17 quarters with good PRF difference image offsets

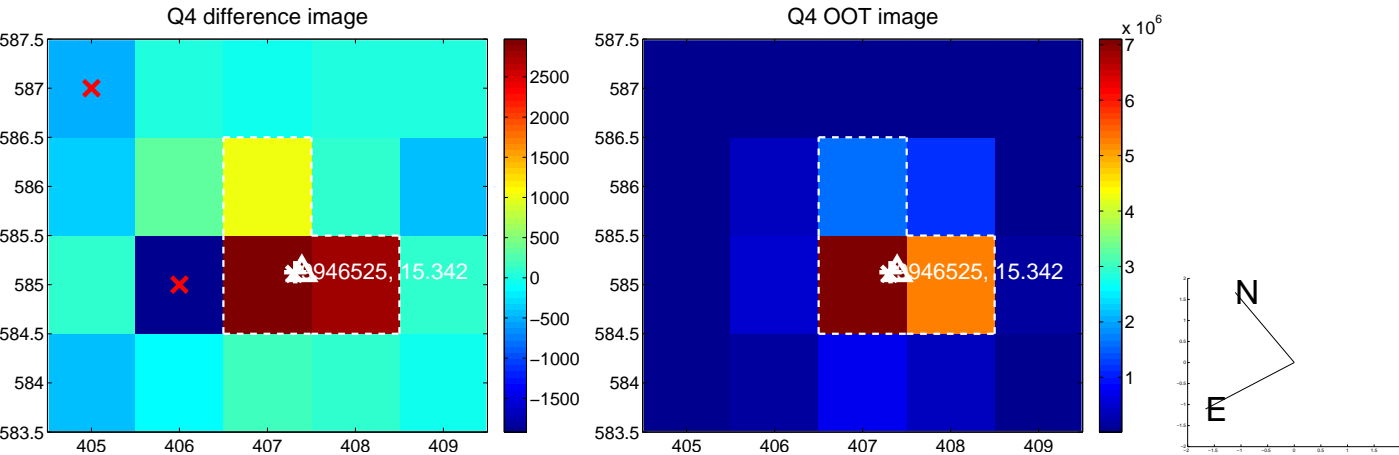
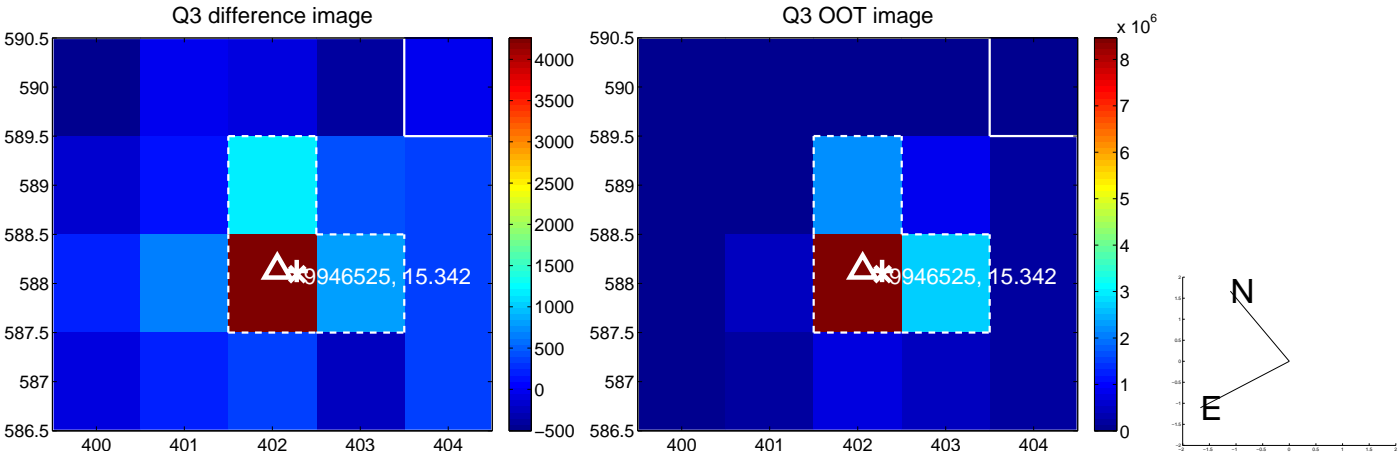
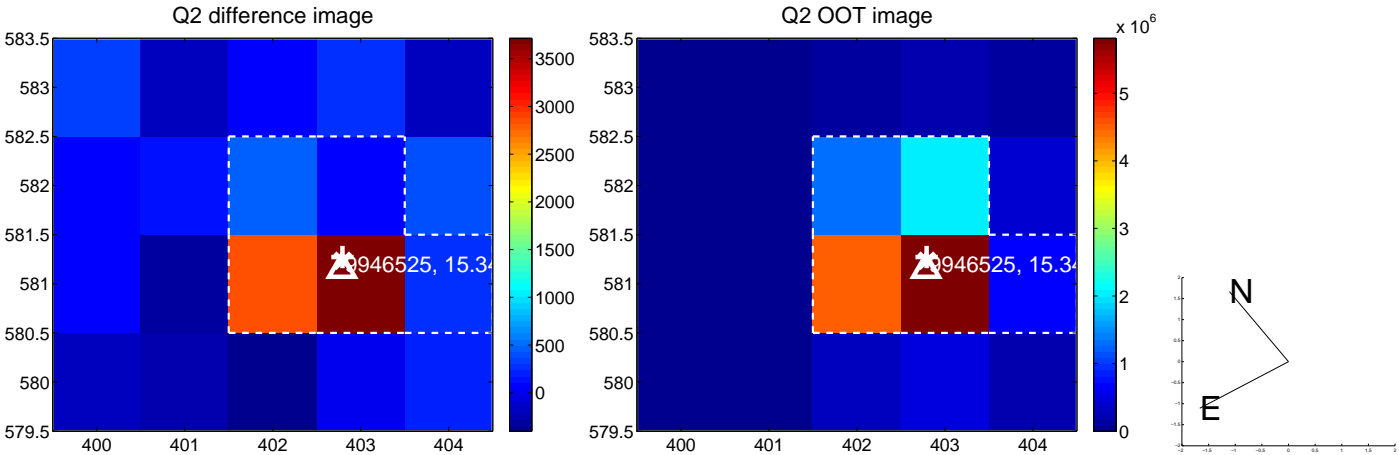
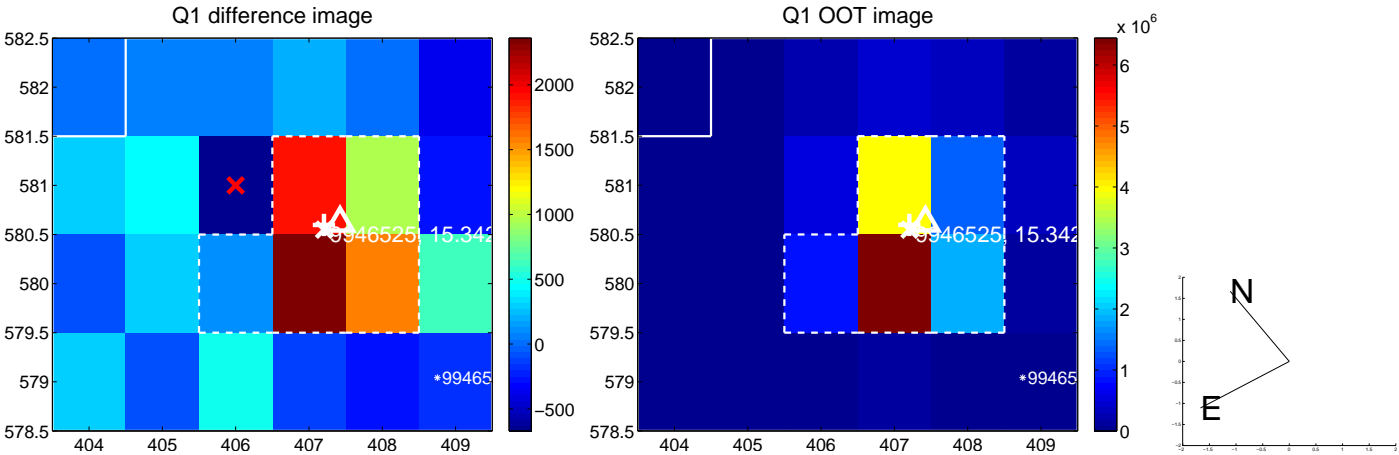
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.185 \pm 0.104$	1.77	$-0.162 \pm 0.104$	$0.089 \pm 0.107$
PRF-fit source offset from KIC position	<b><math>0.330 \pm 0.102</math></b>	<b>3.22</b>	$-0.260 \pm 0.101$	$0.203 \pm 0.104$
photometric centroid source offset	$0.36 \pm 0.29$	1.25	$0.24 \pm 0.30$	$0.27 \pm 0.28$

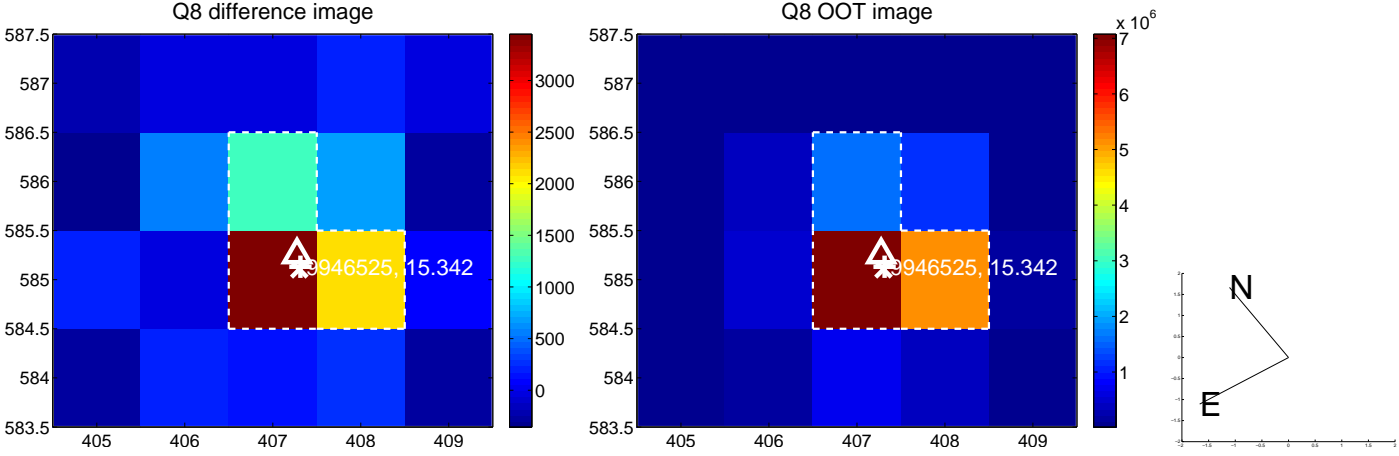
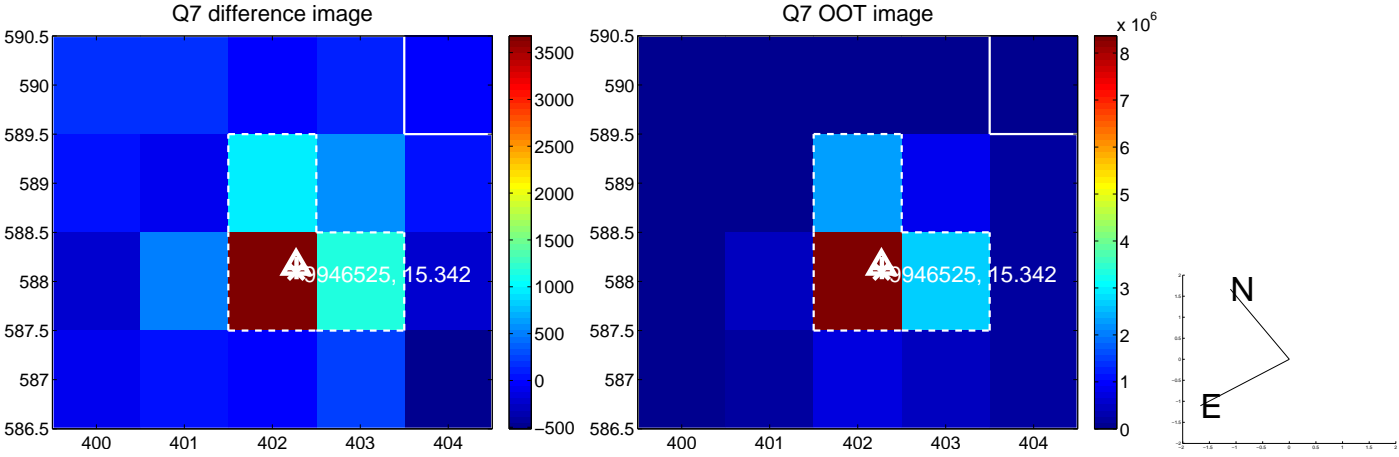
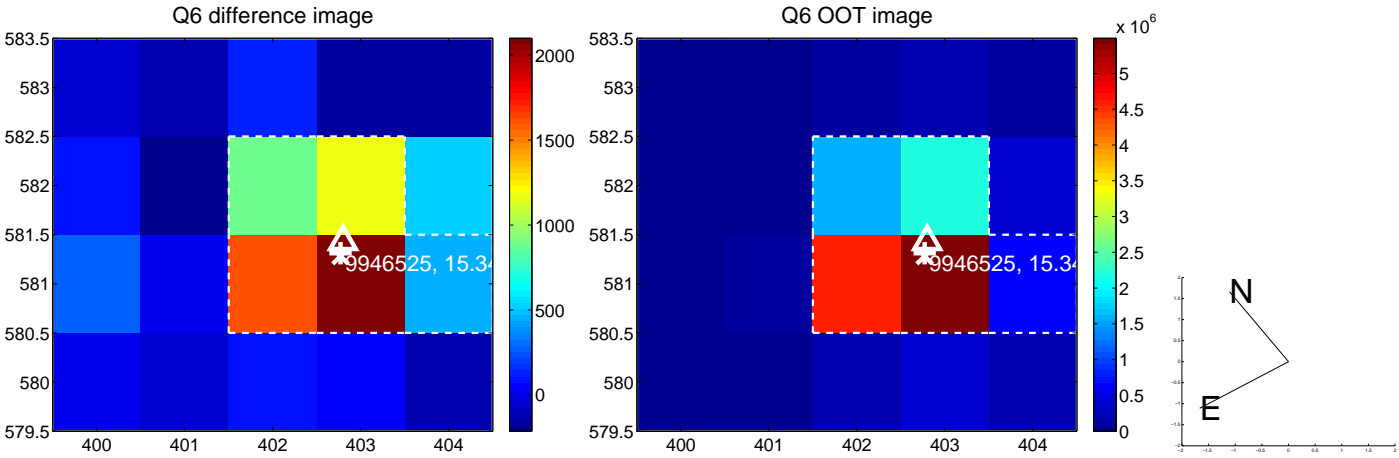
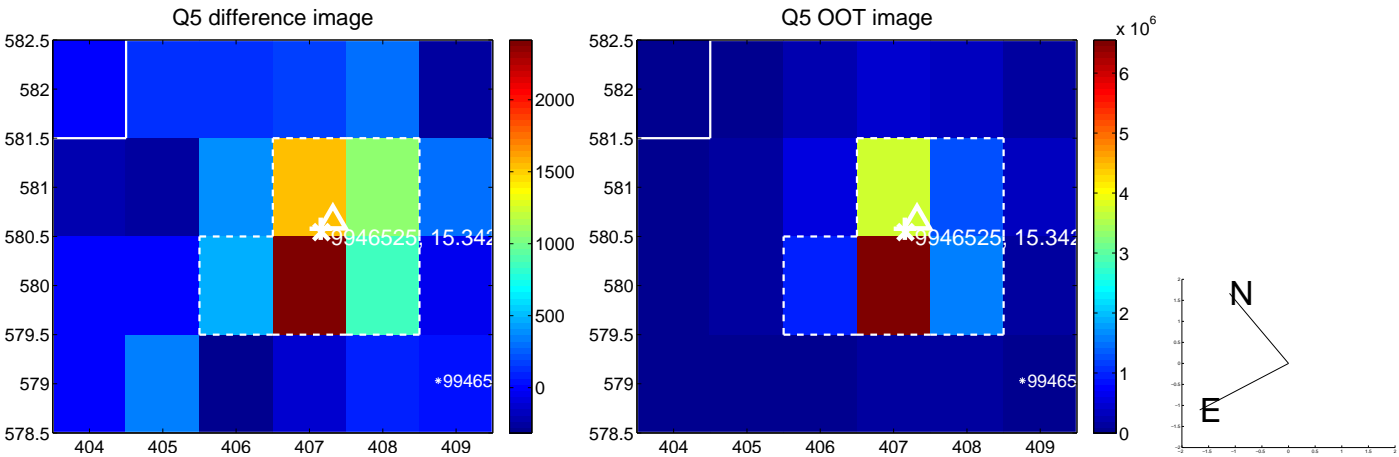


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

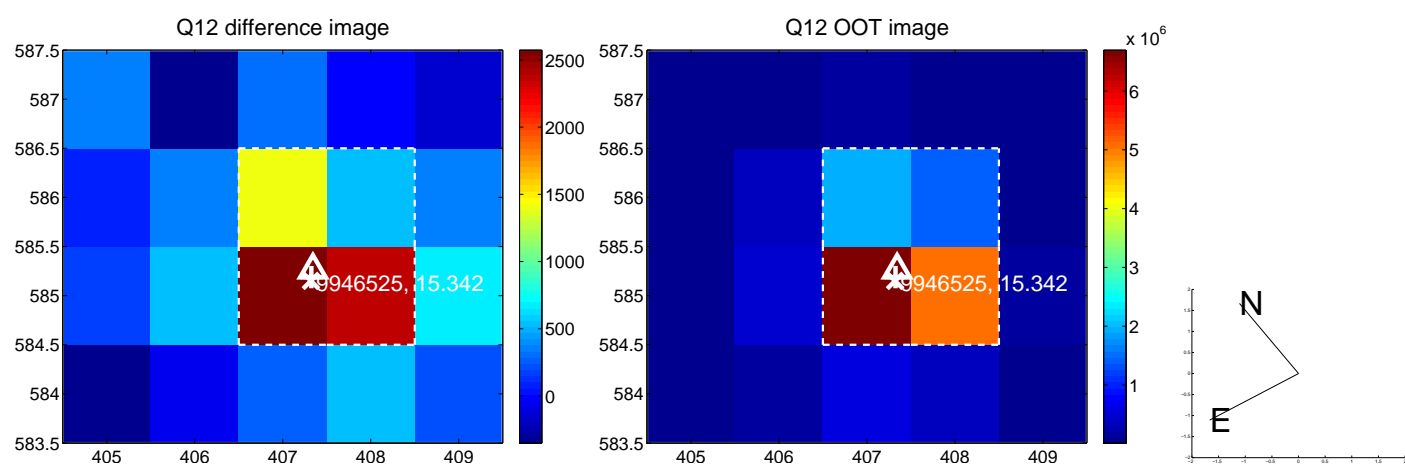
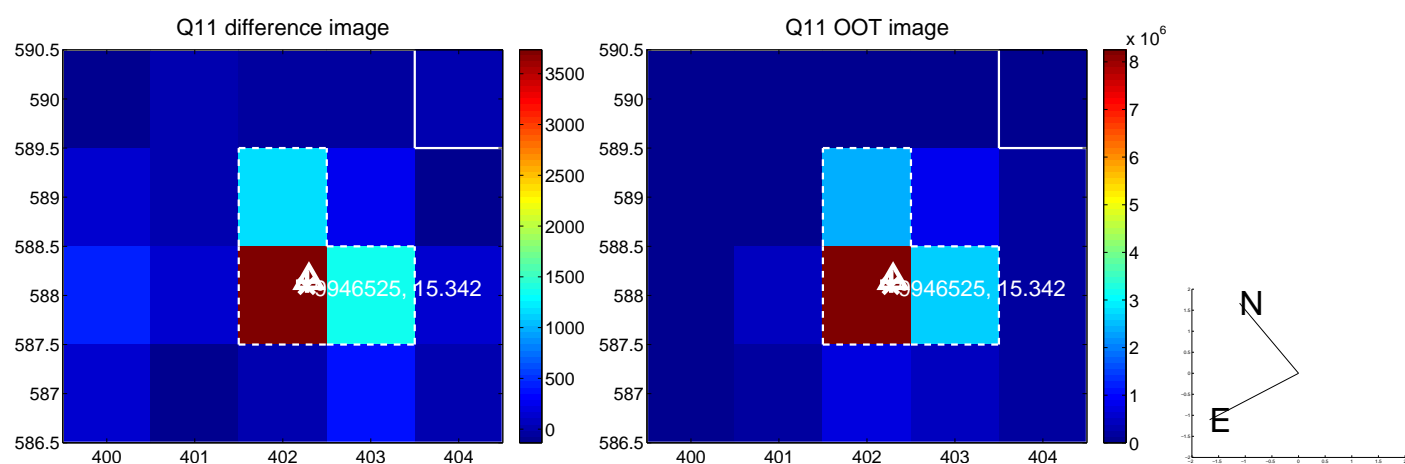
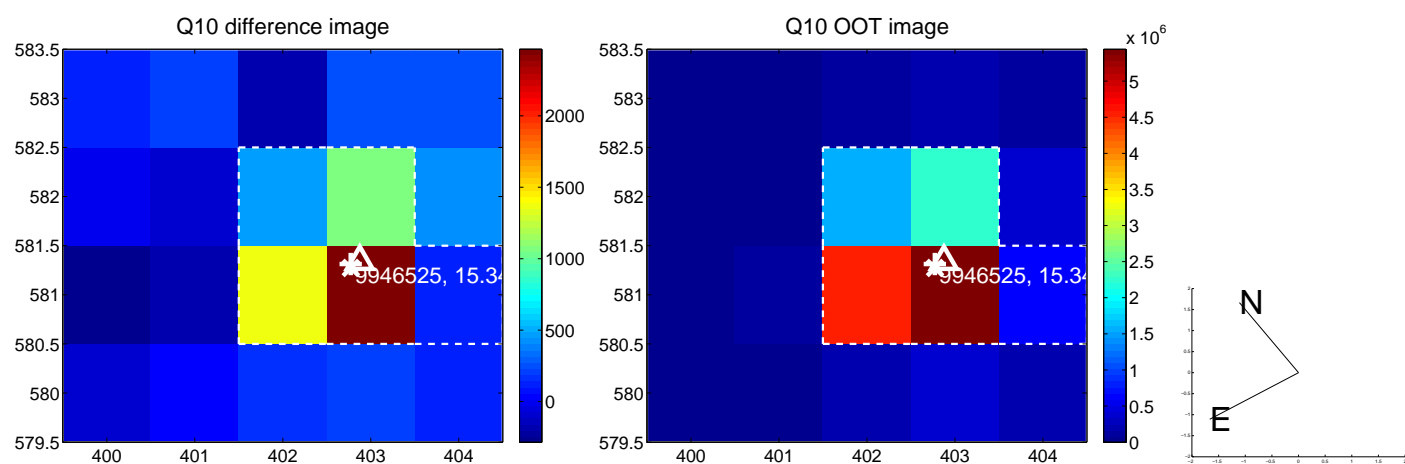
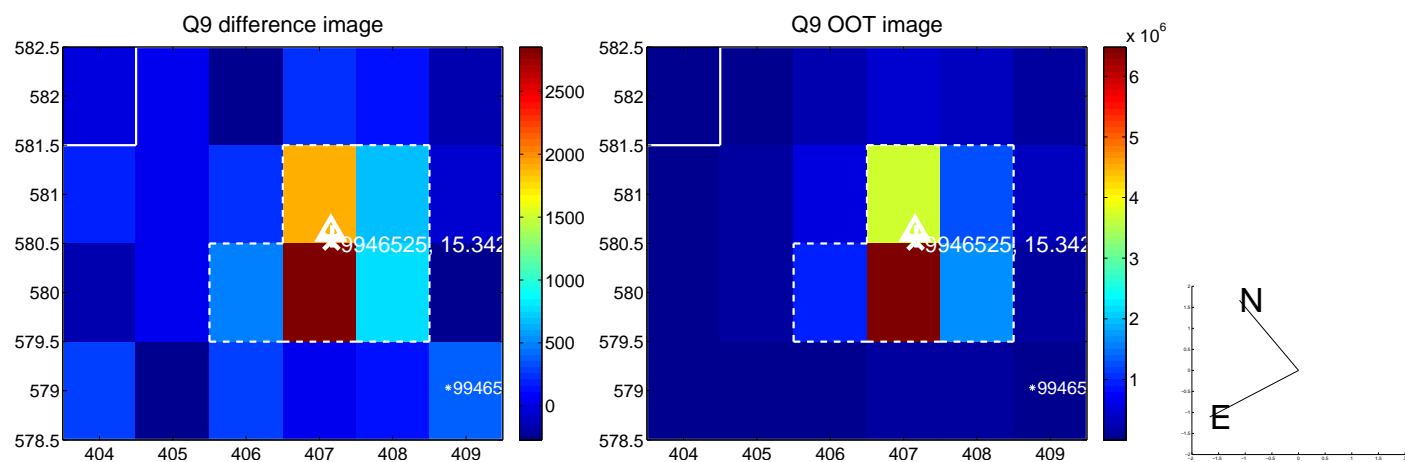


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

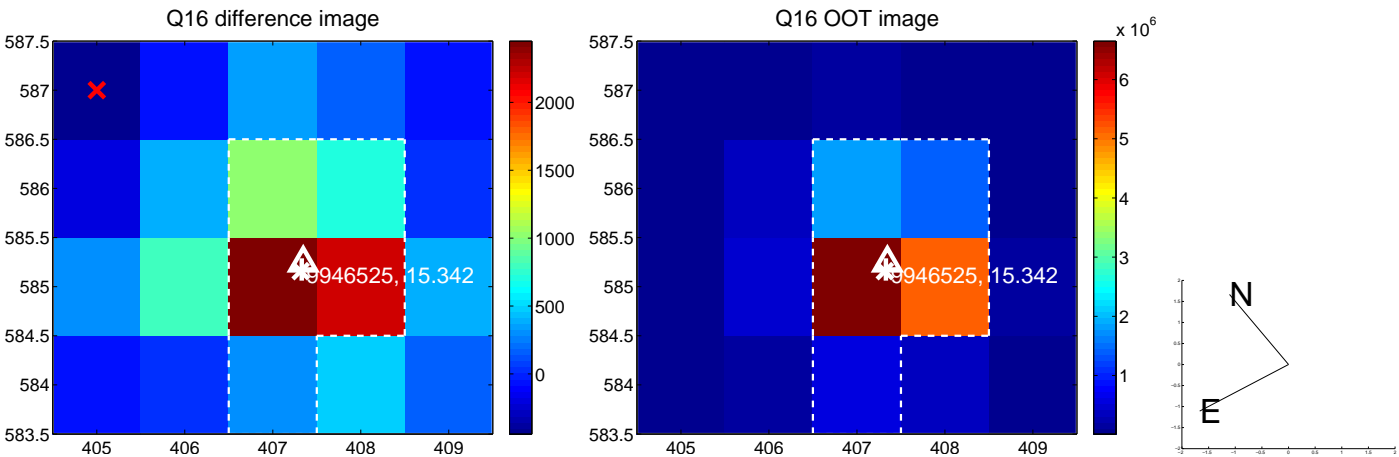
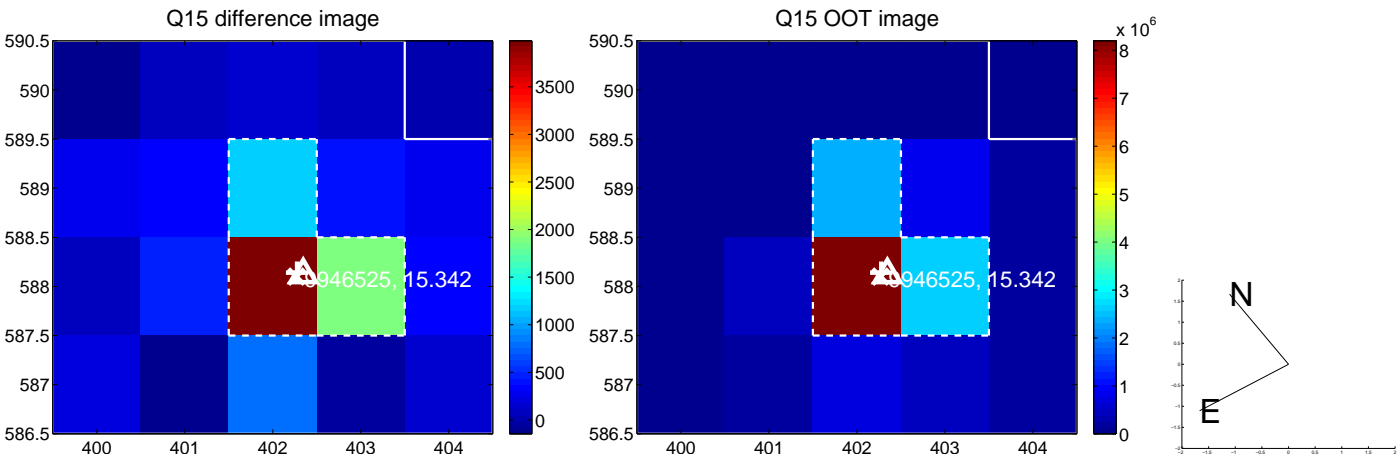
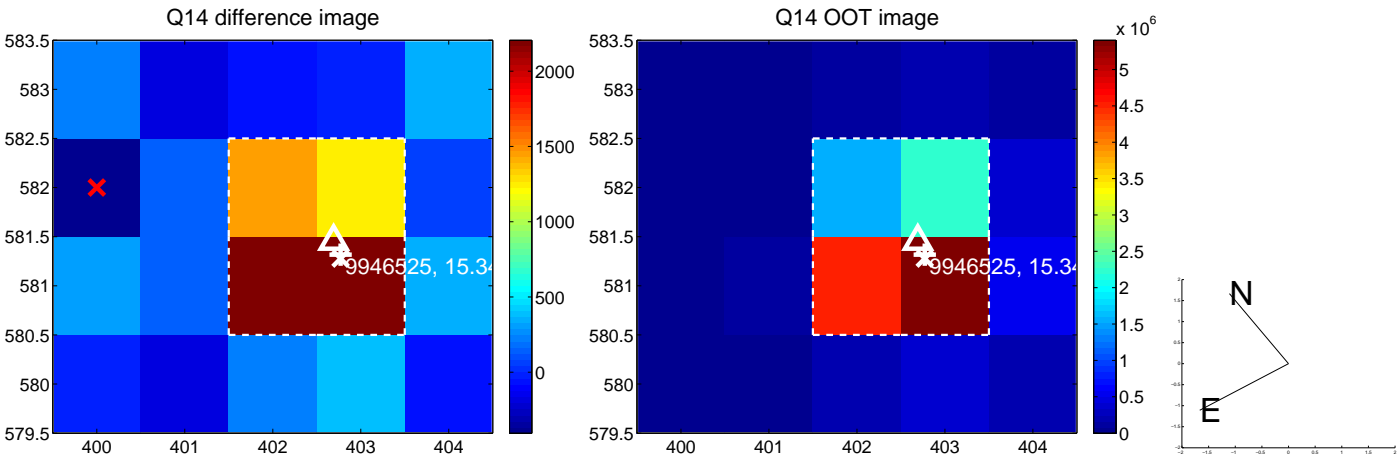
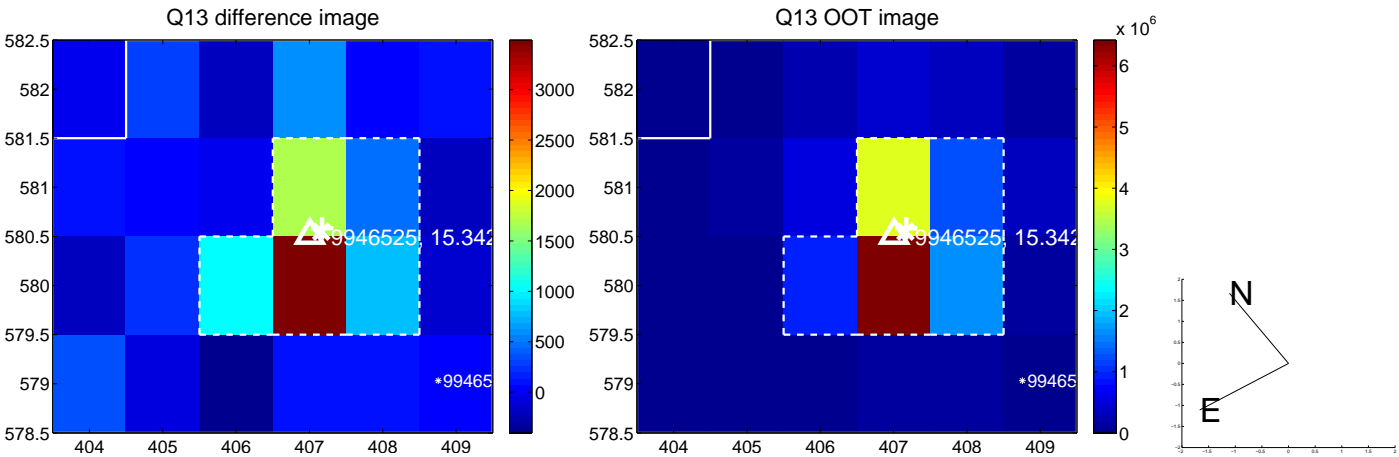




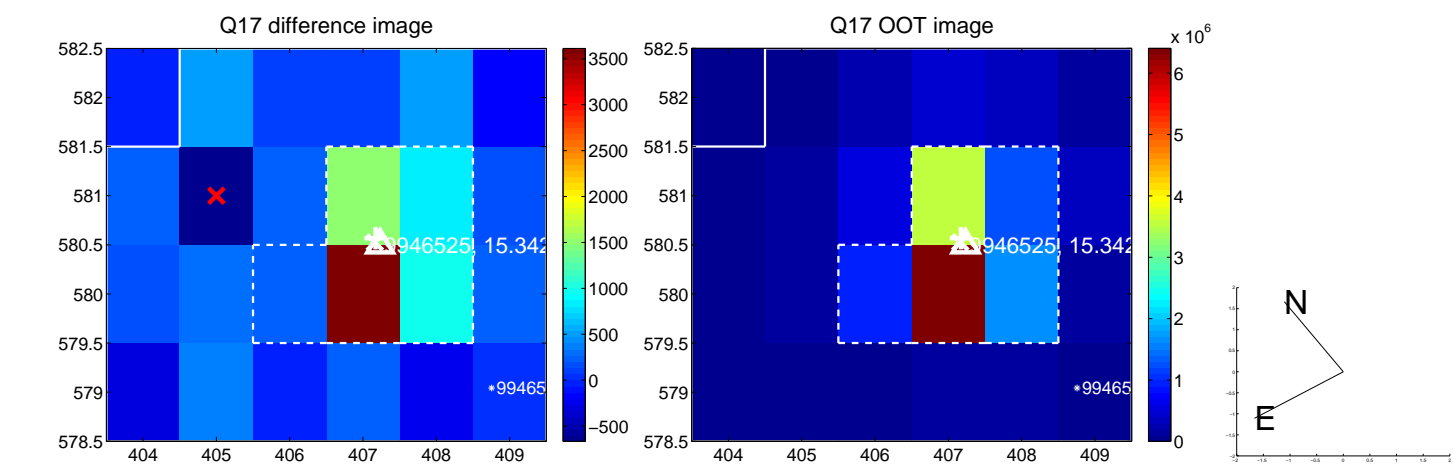
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



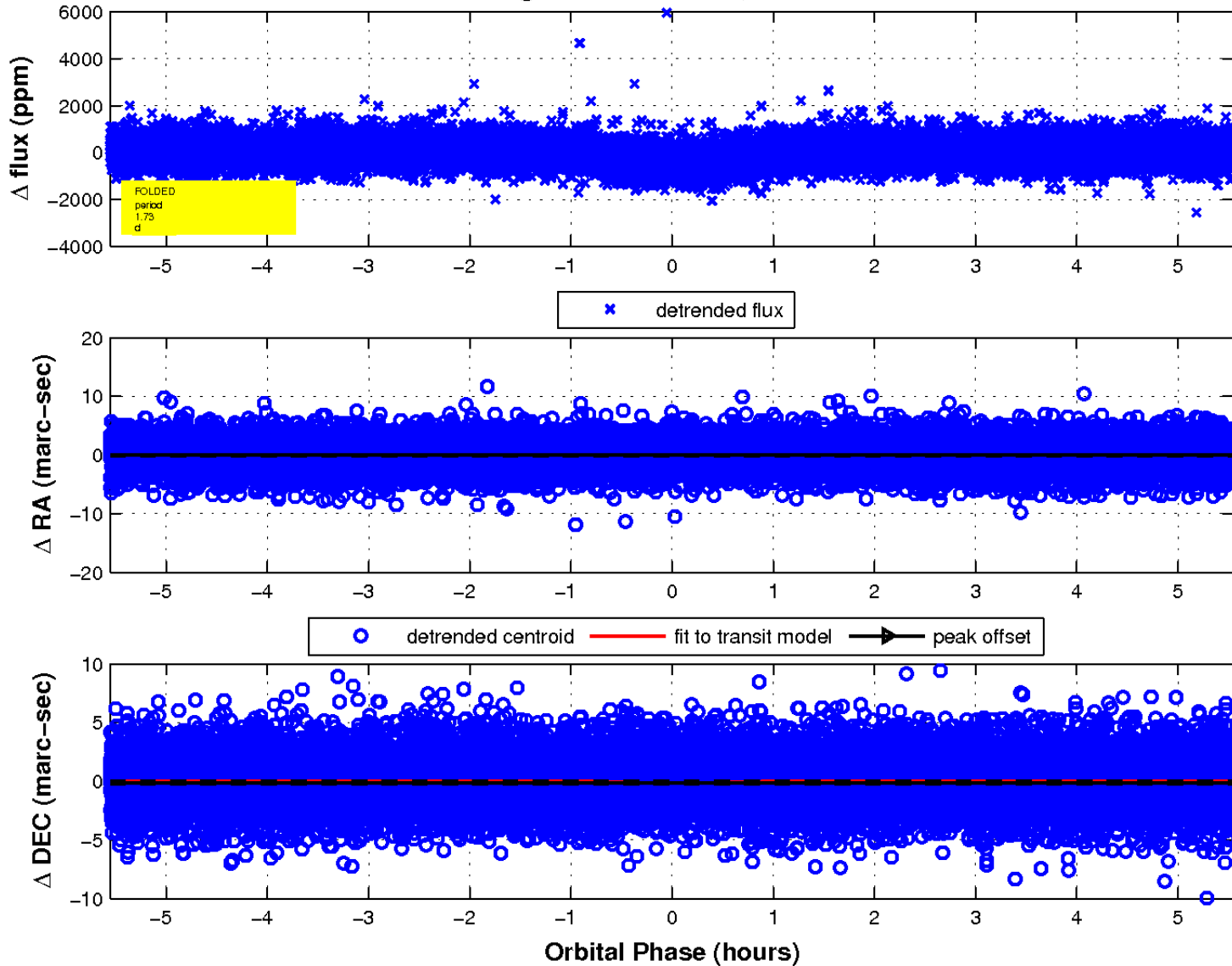
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 3



# UKIRT Image

Declination

